

Figure 1

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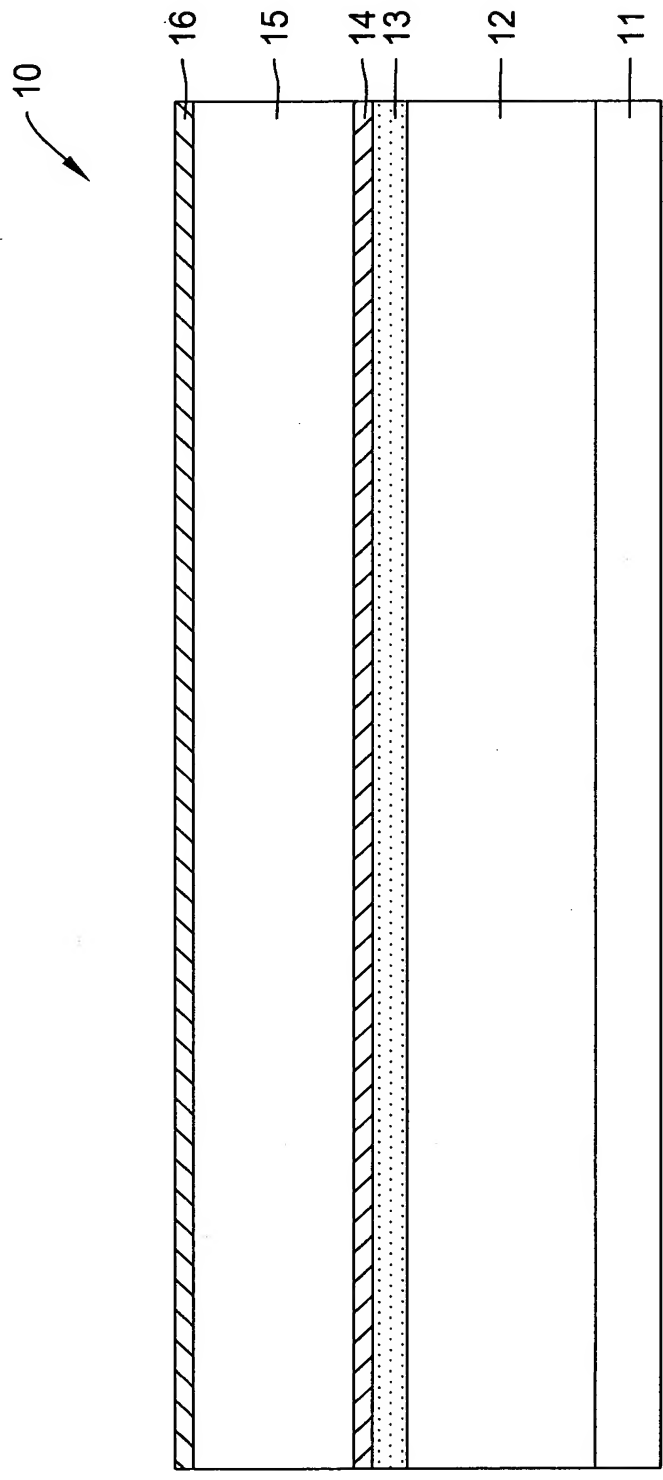


Figure 2

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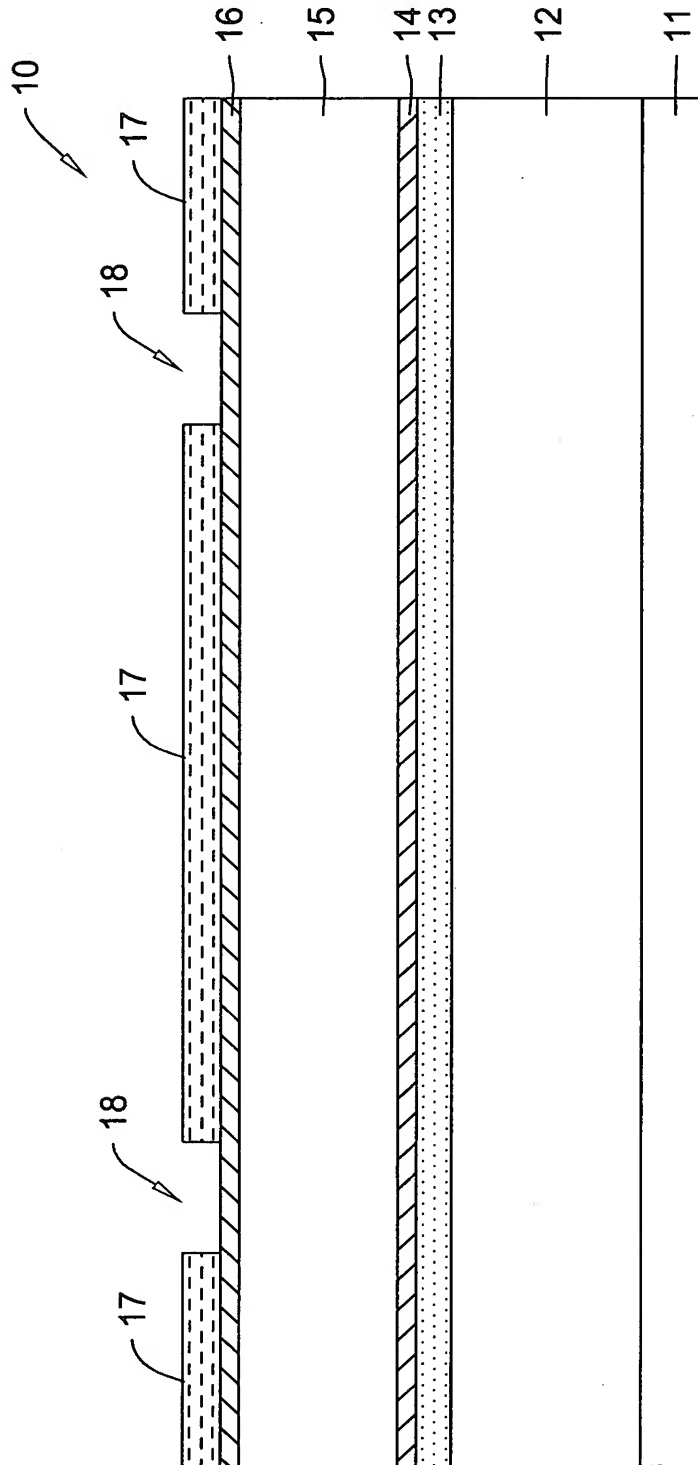


Figure 2A

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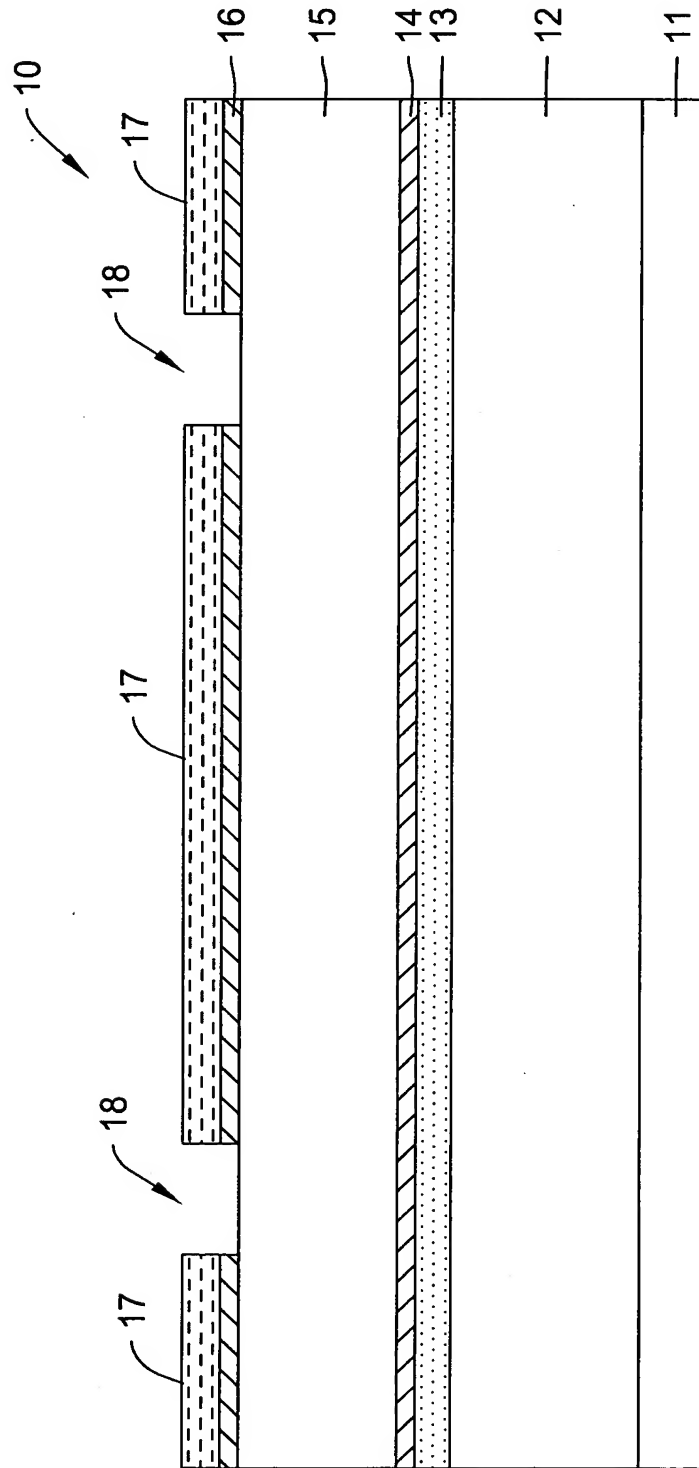


Figure 3



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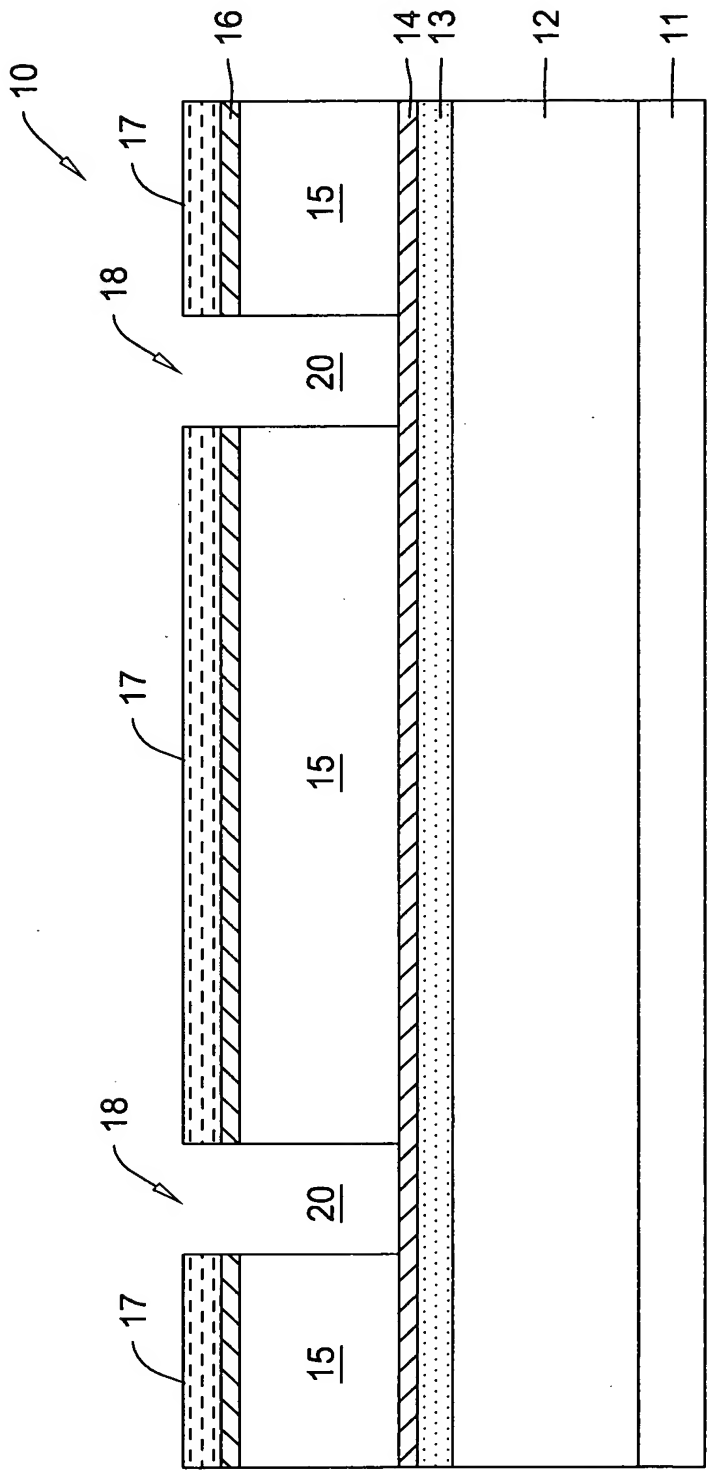


Figure 4

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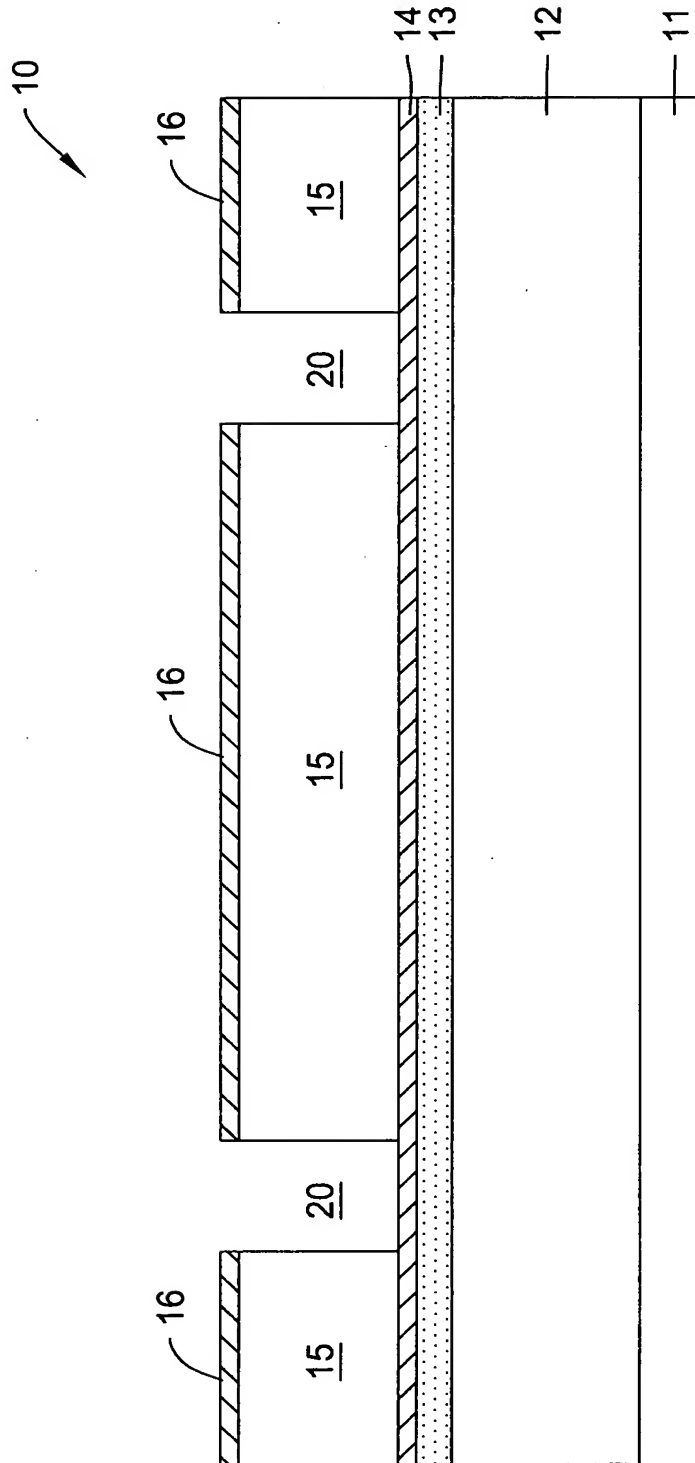


Figure 5

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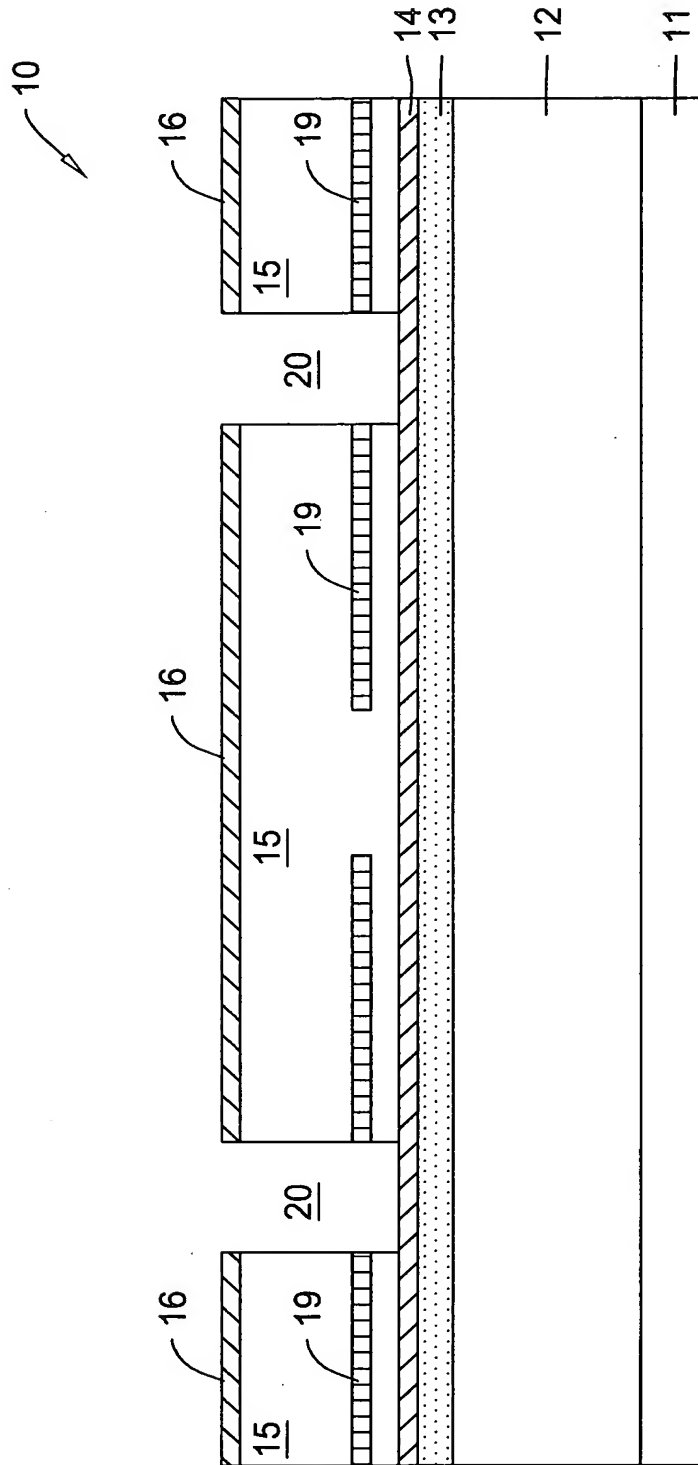


Figure 6

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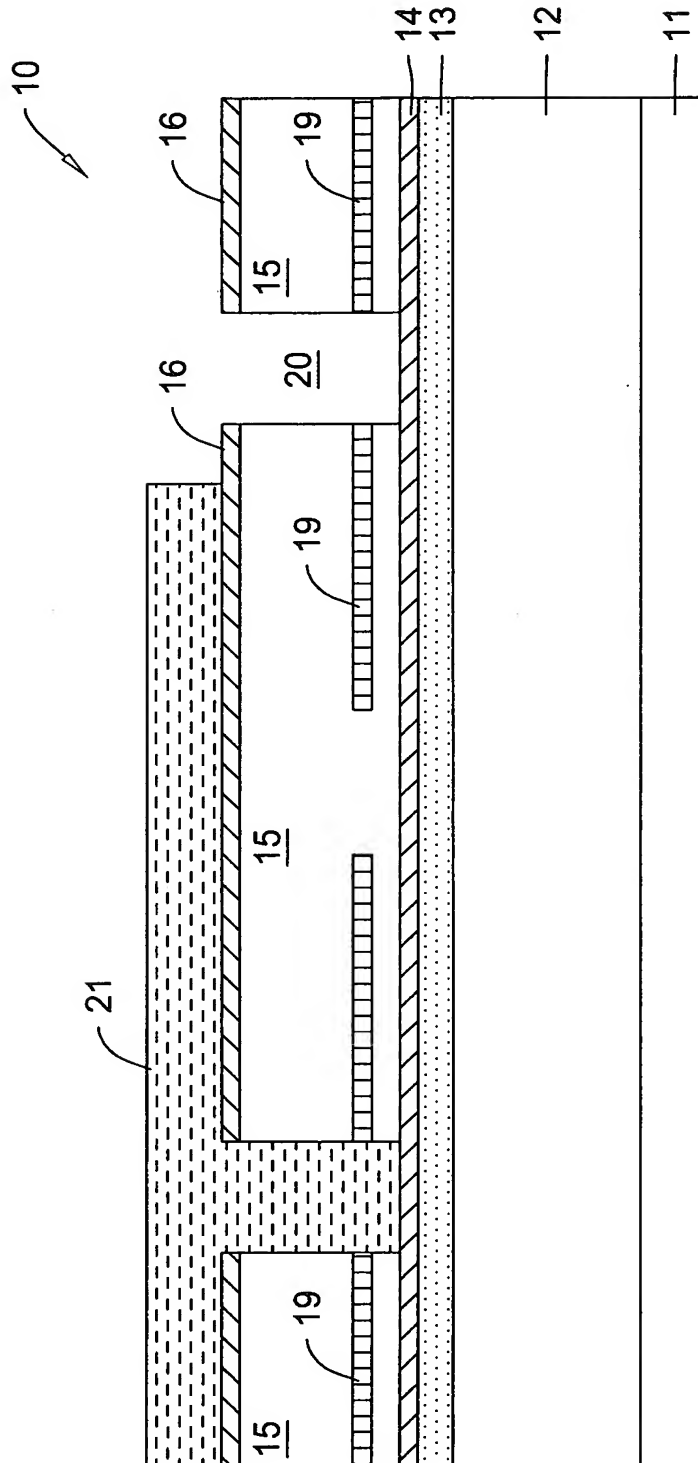


Figure 7

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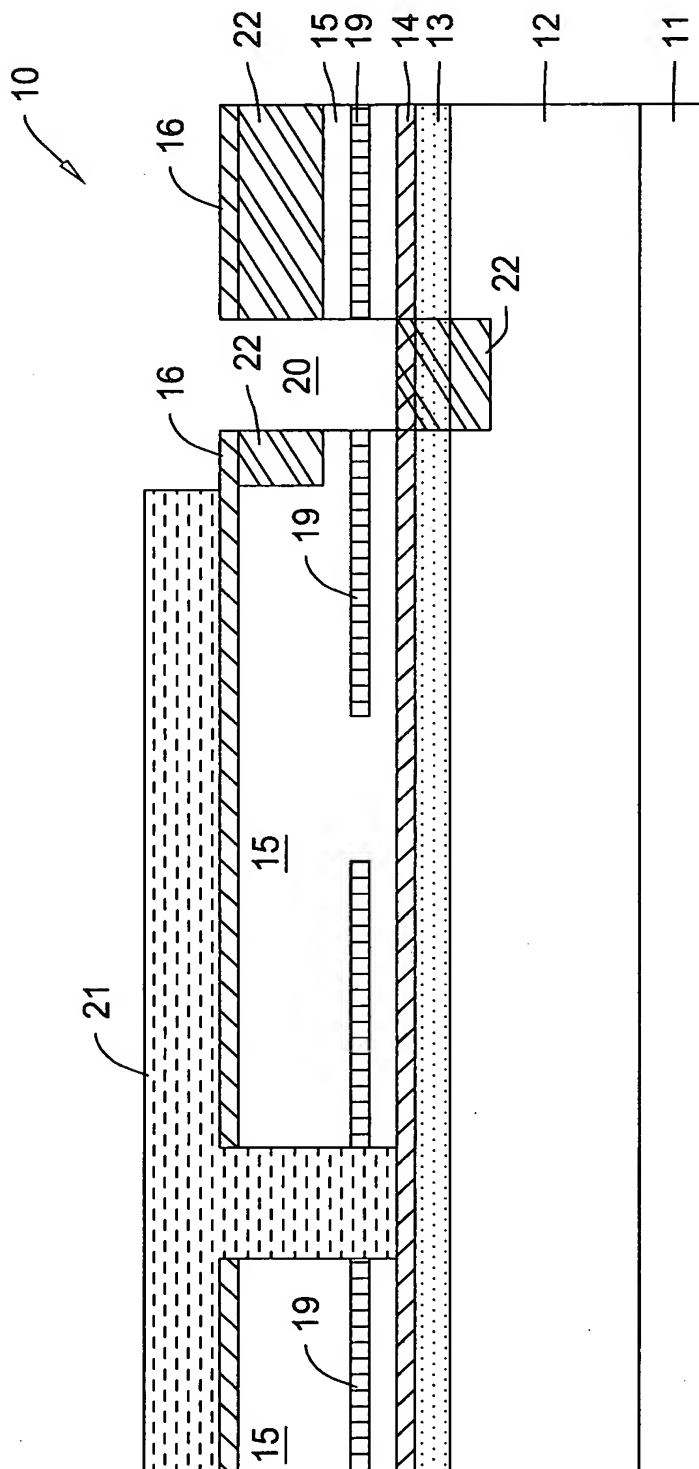


Figure 8

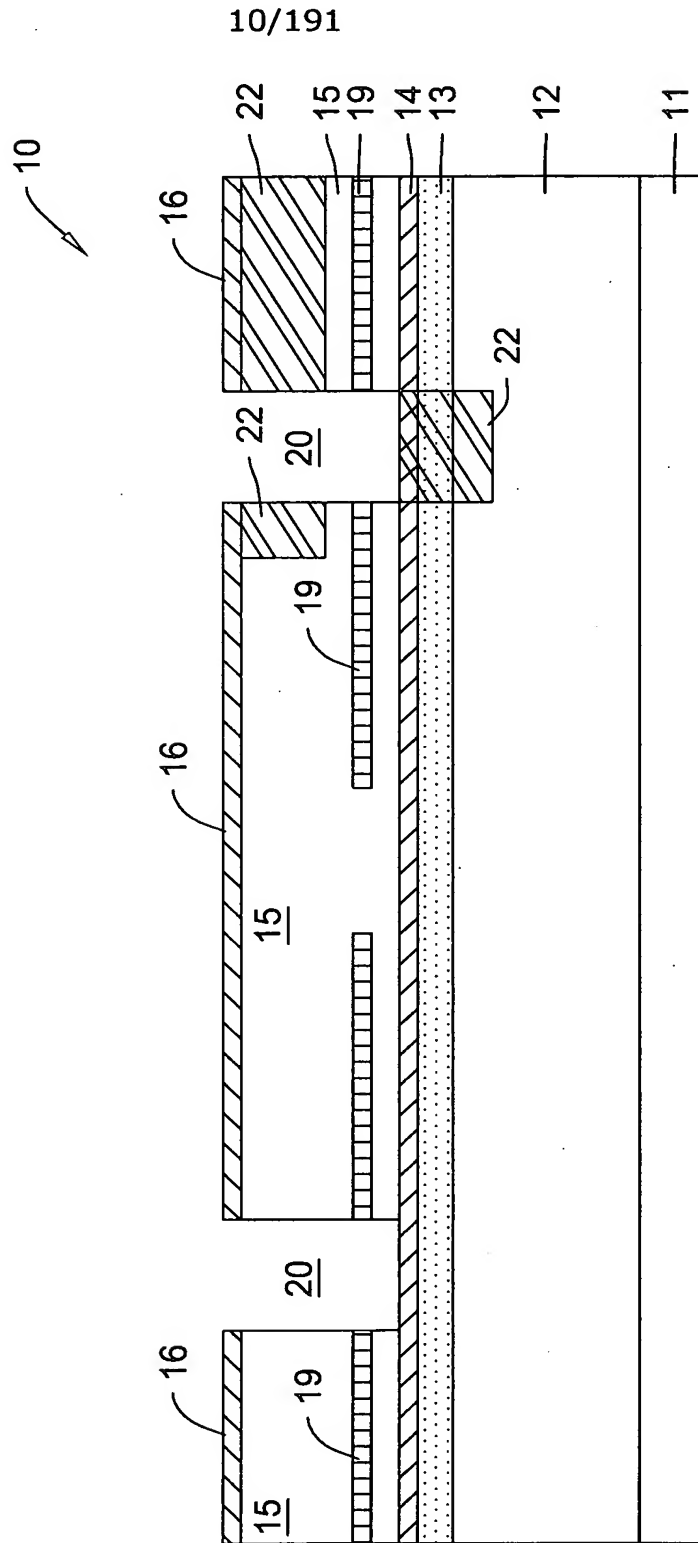


Figure 9

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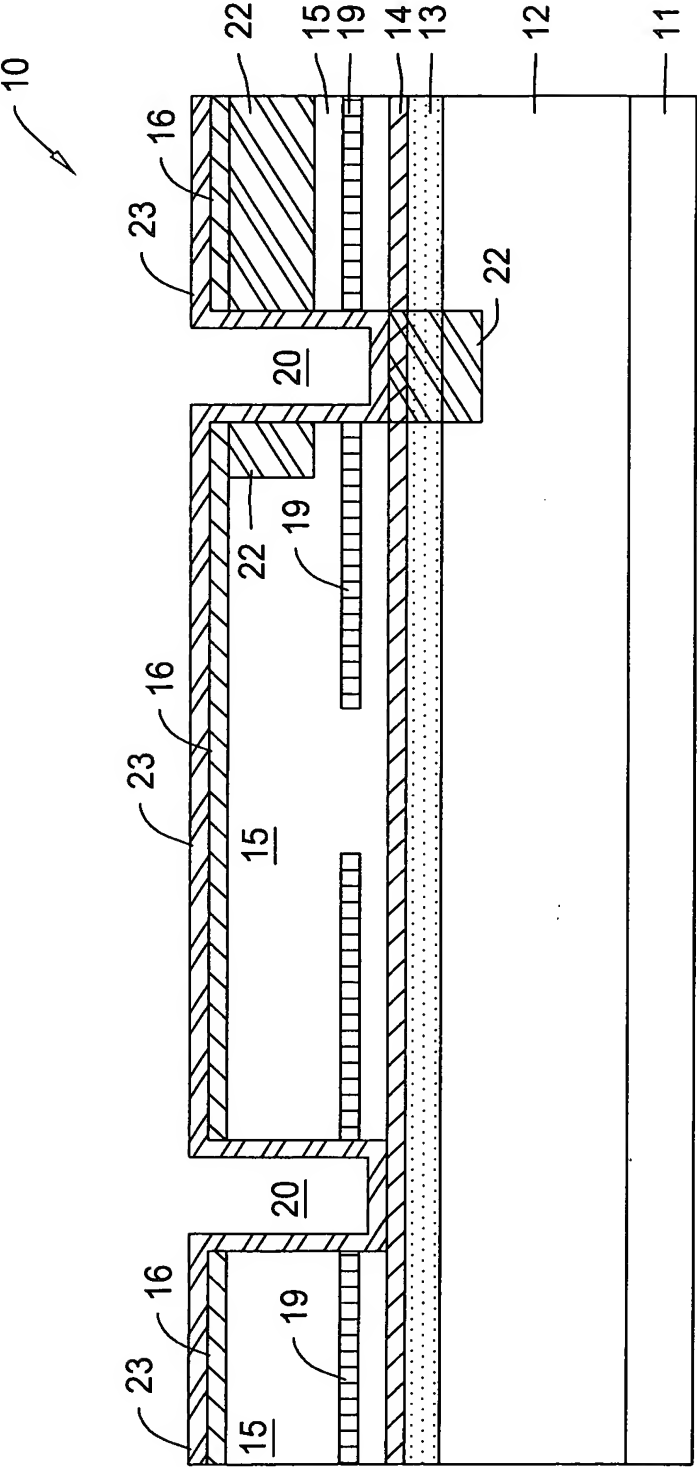


Figure 10

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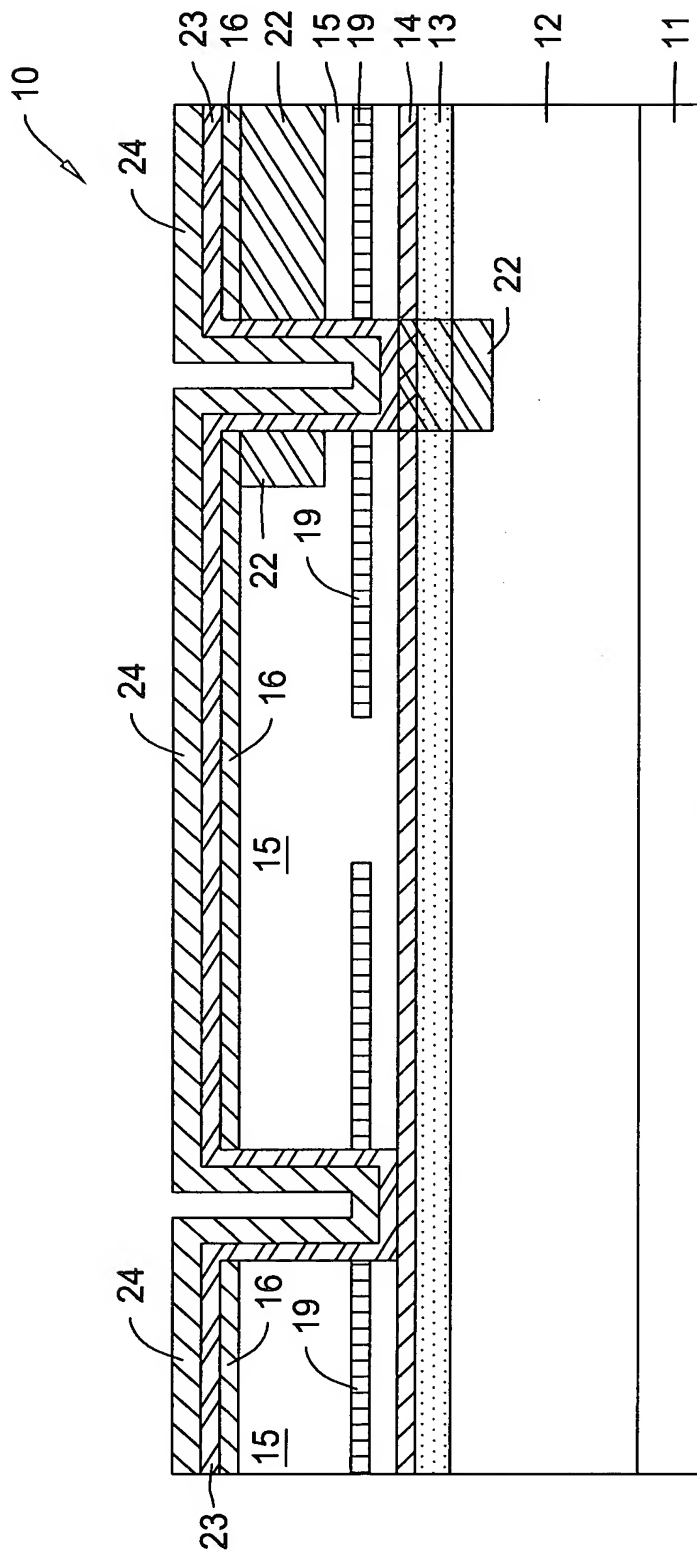


Figure 11



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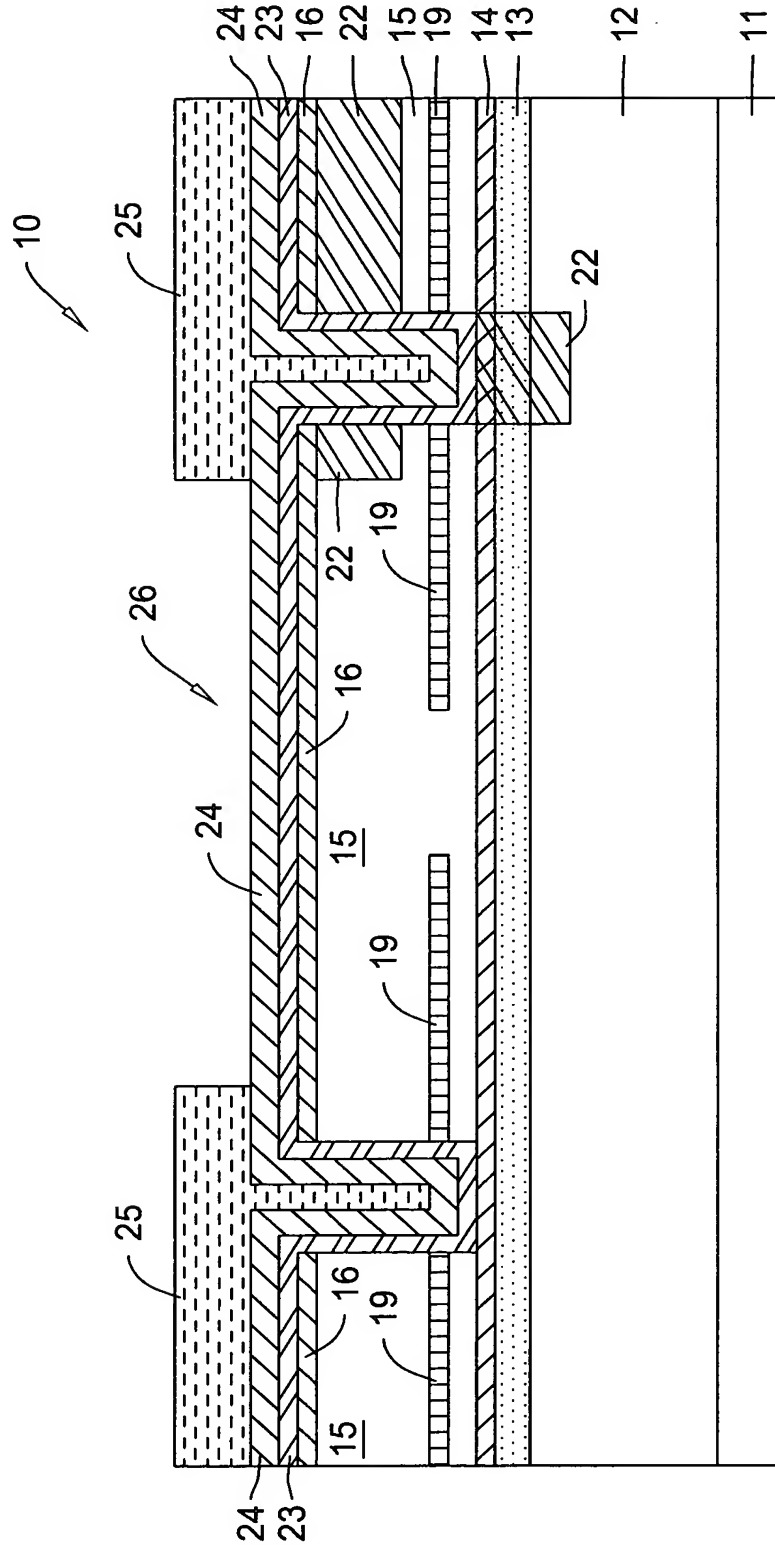


Figure 12

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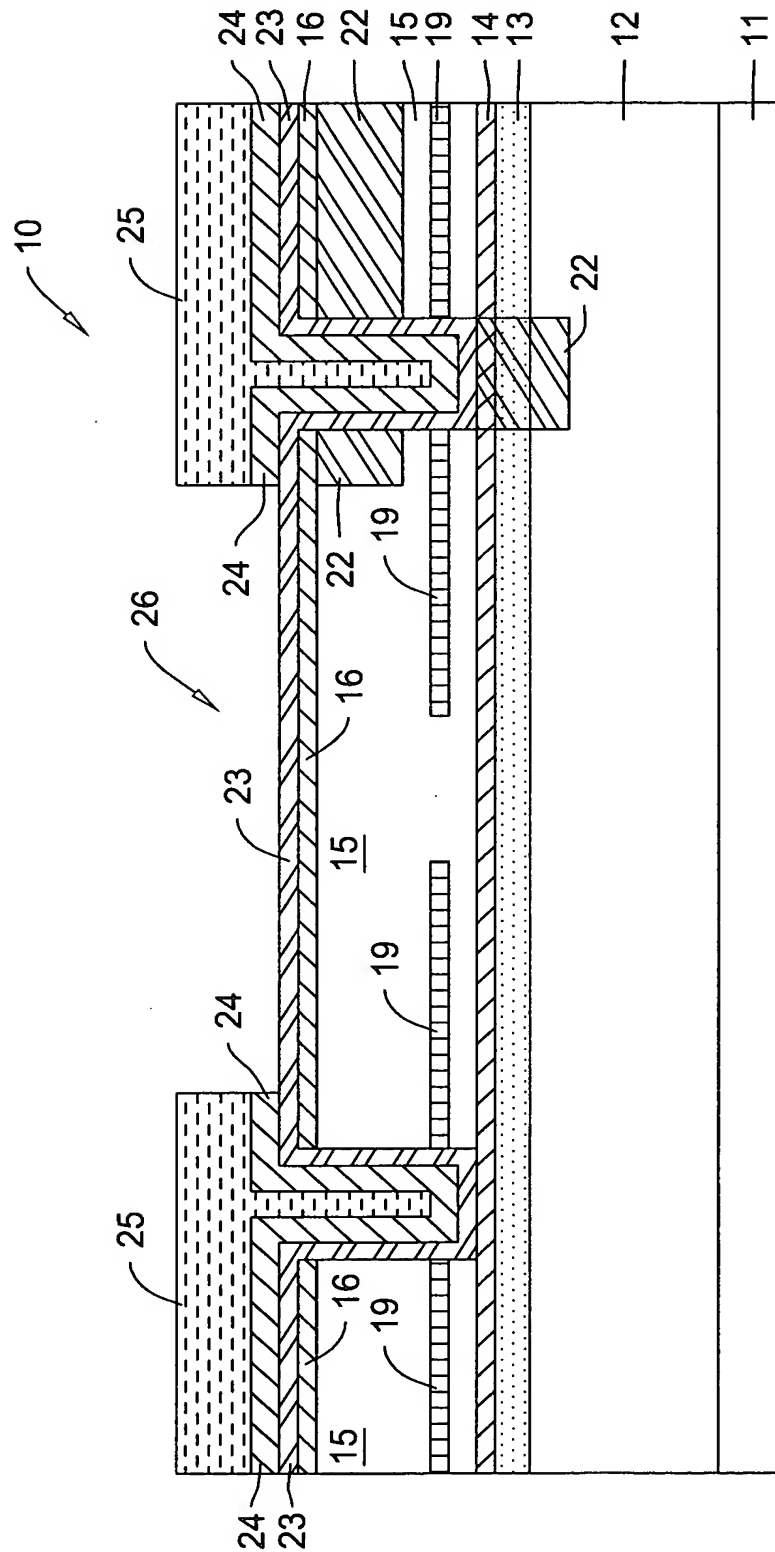


Figure 13

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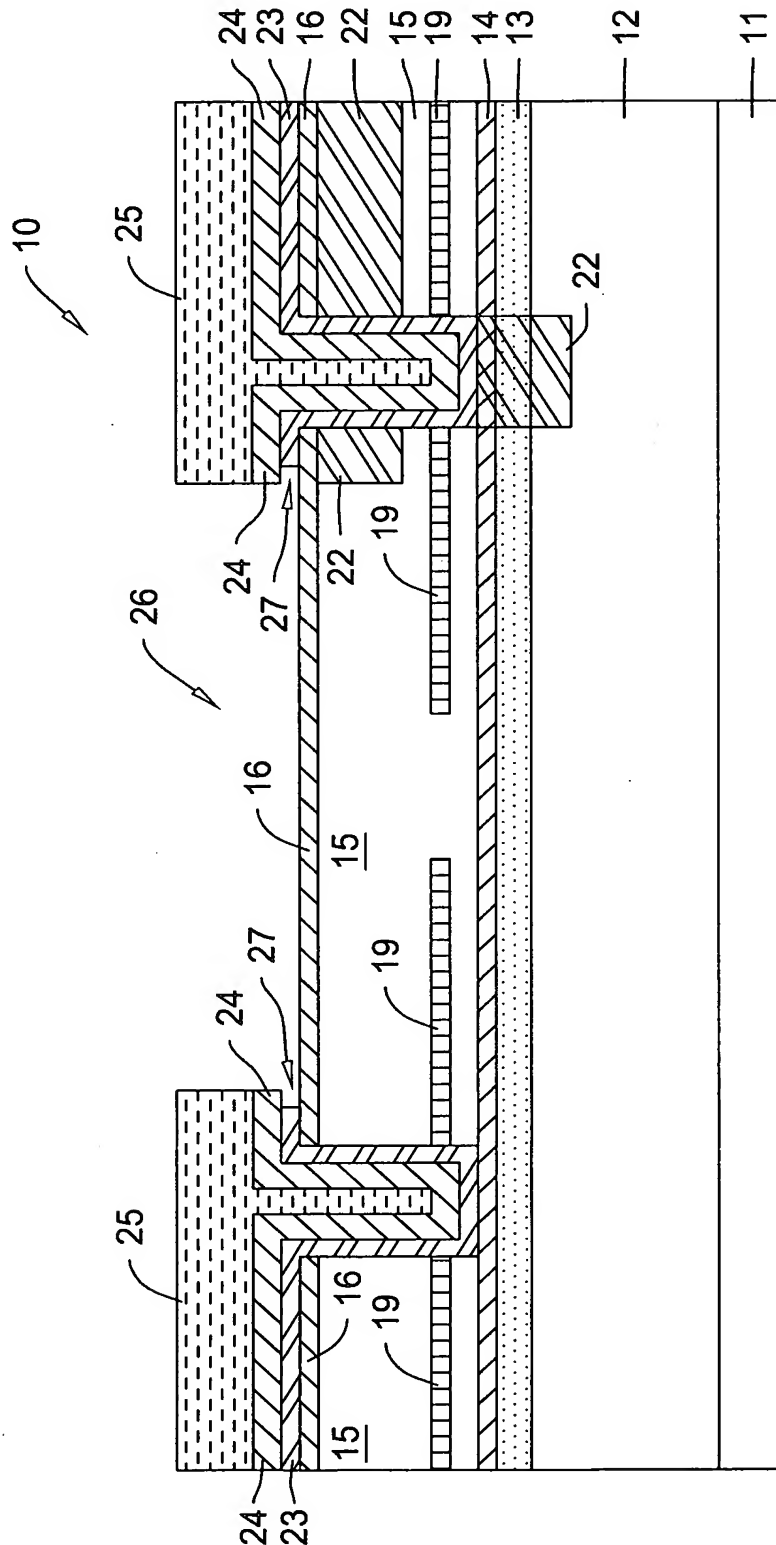


Figure 14

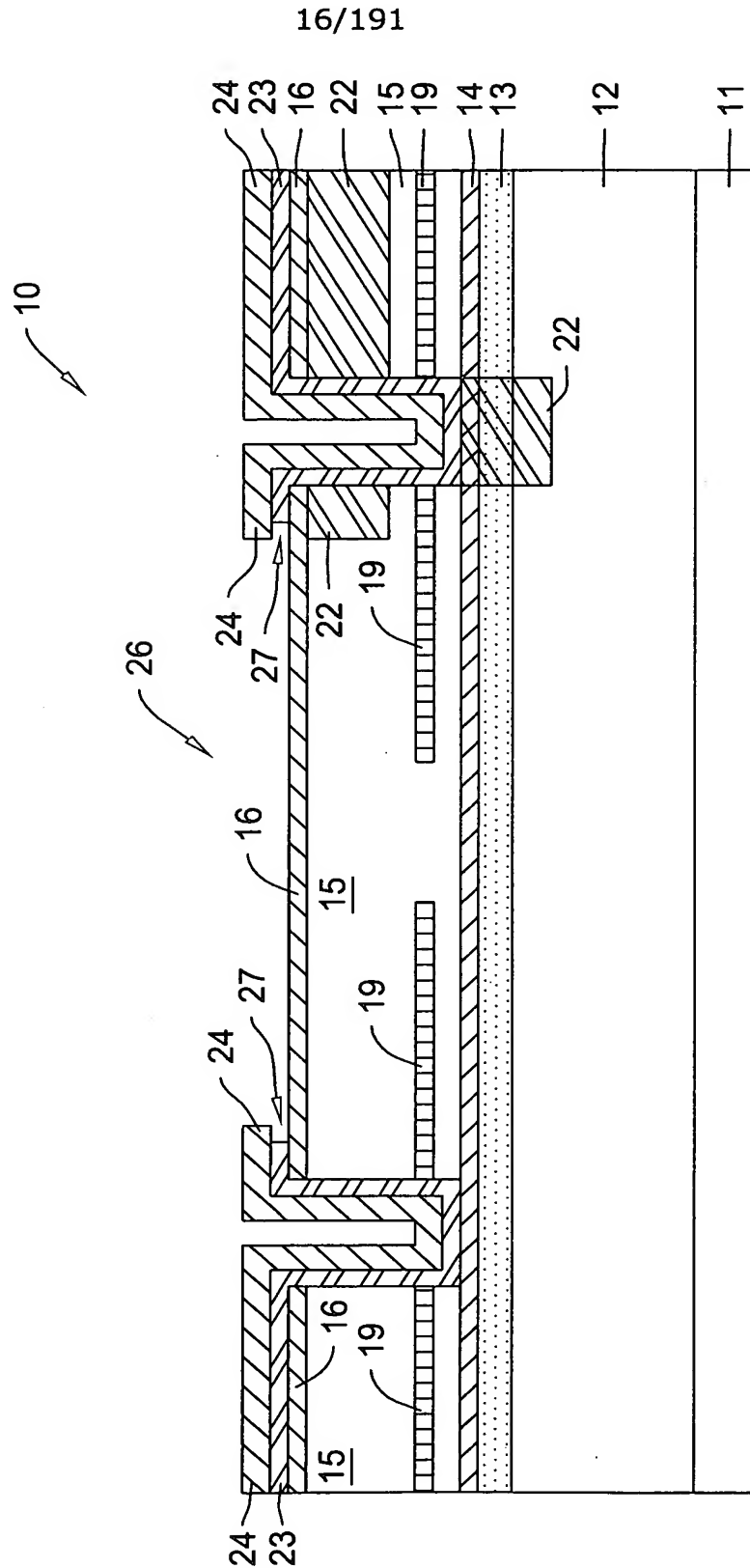


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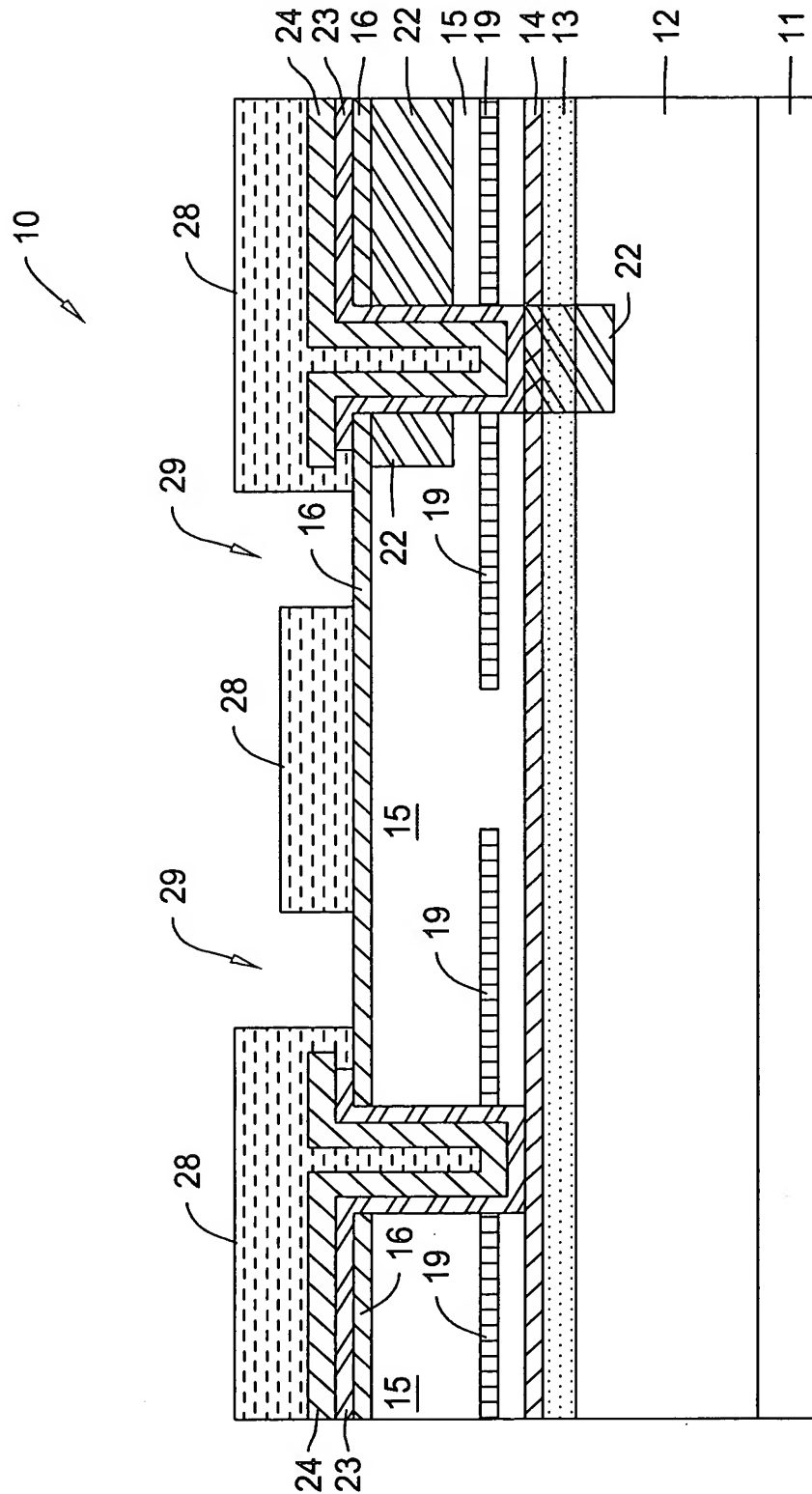


Figure 16

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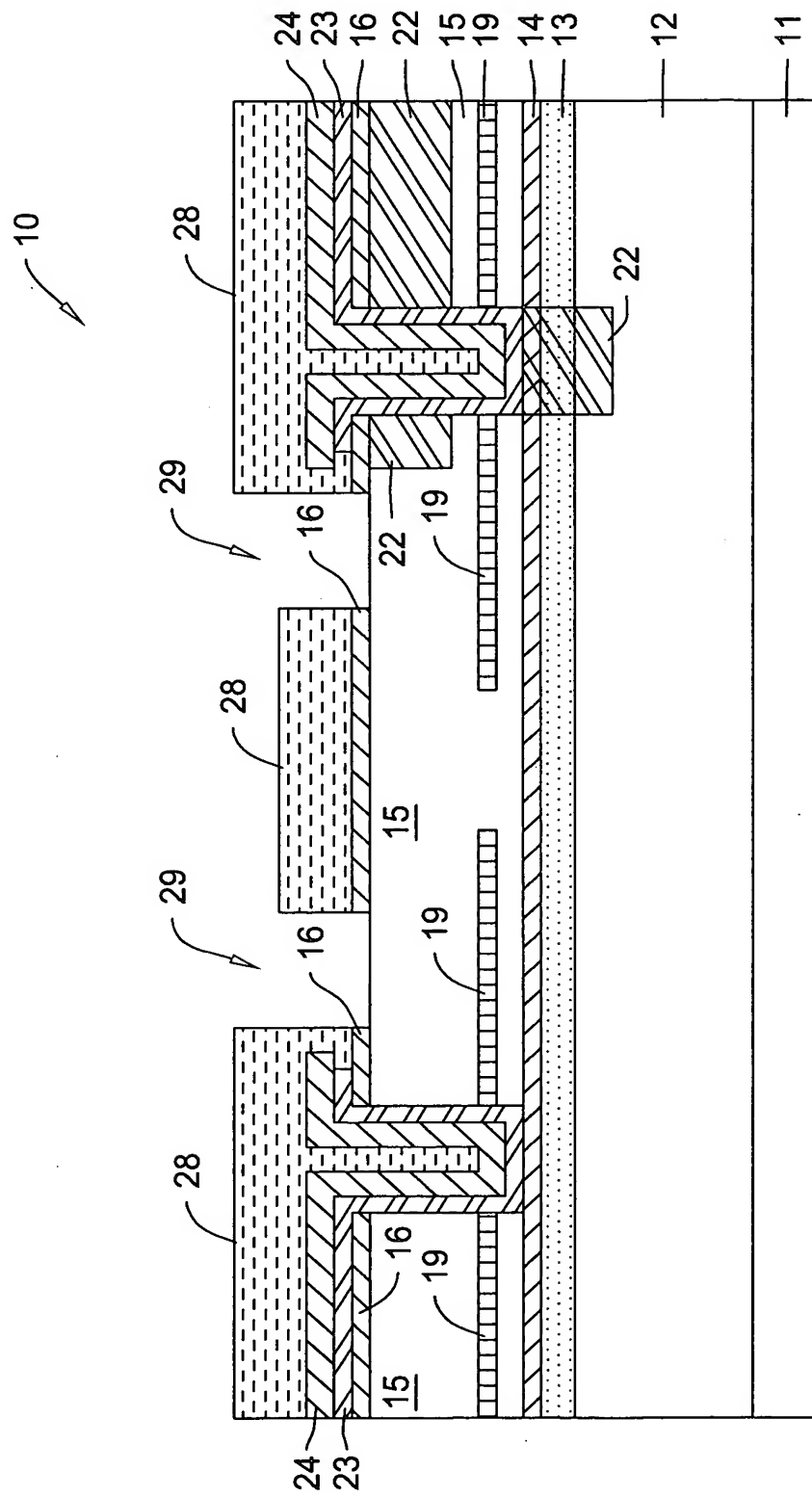


Figure 17

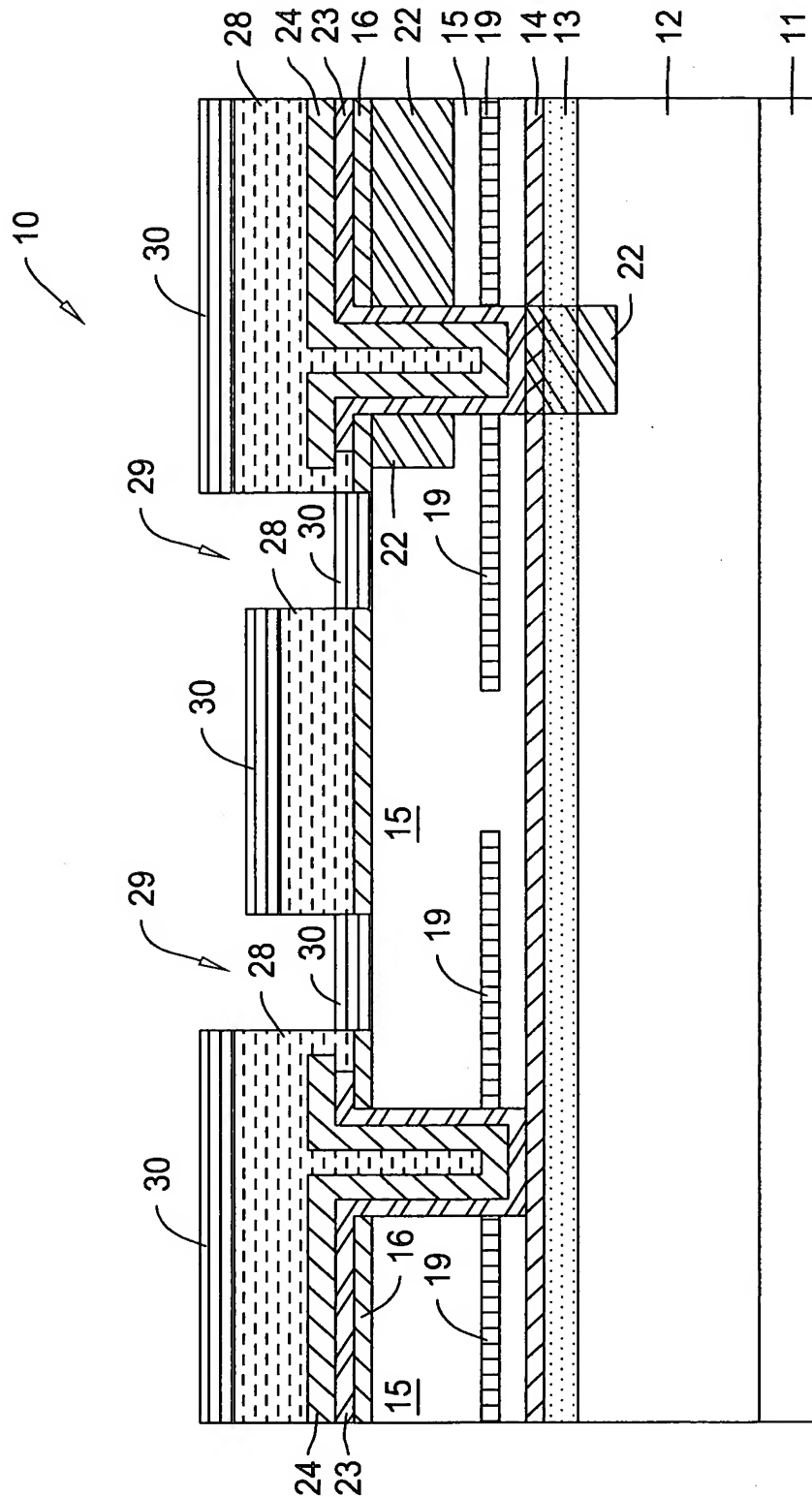


Figure 18

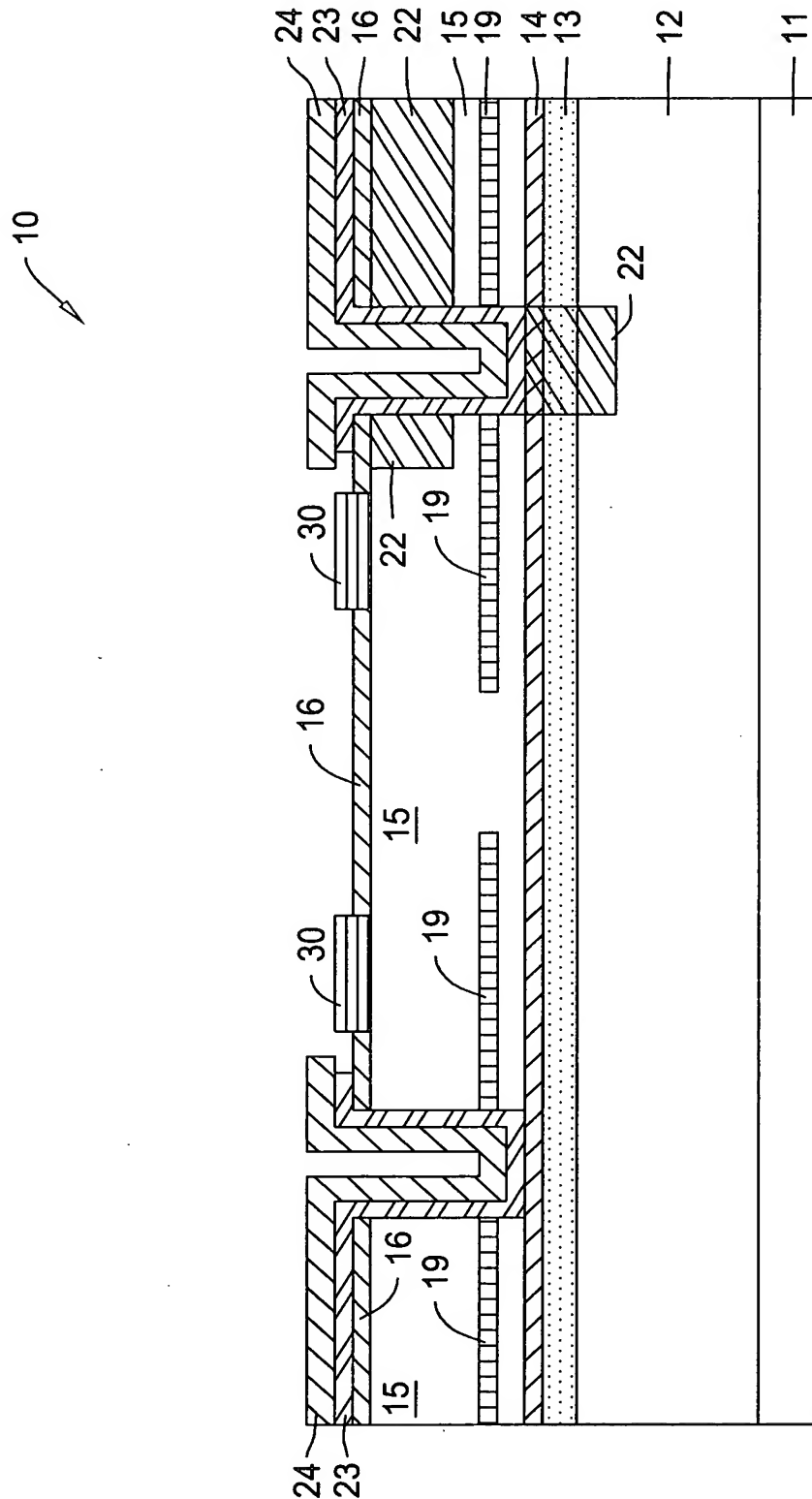


Figure 19



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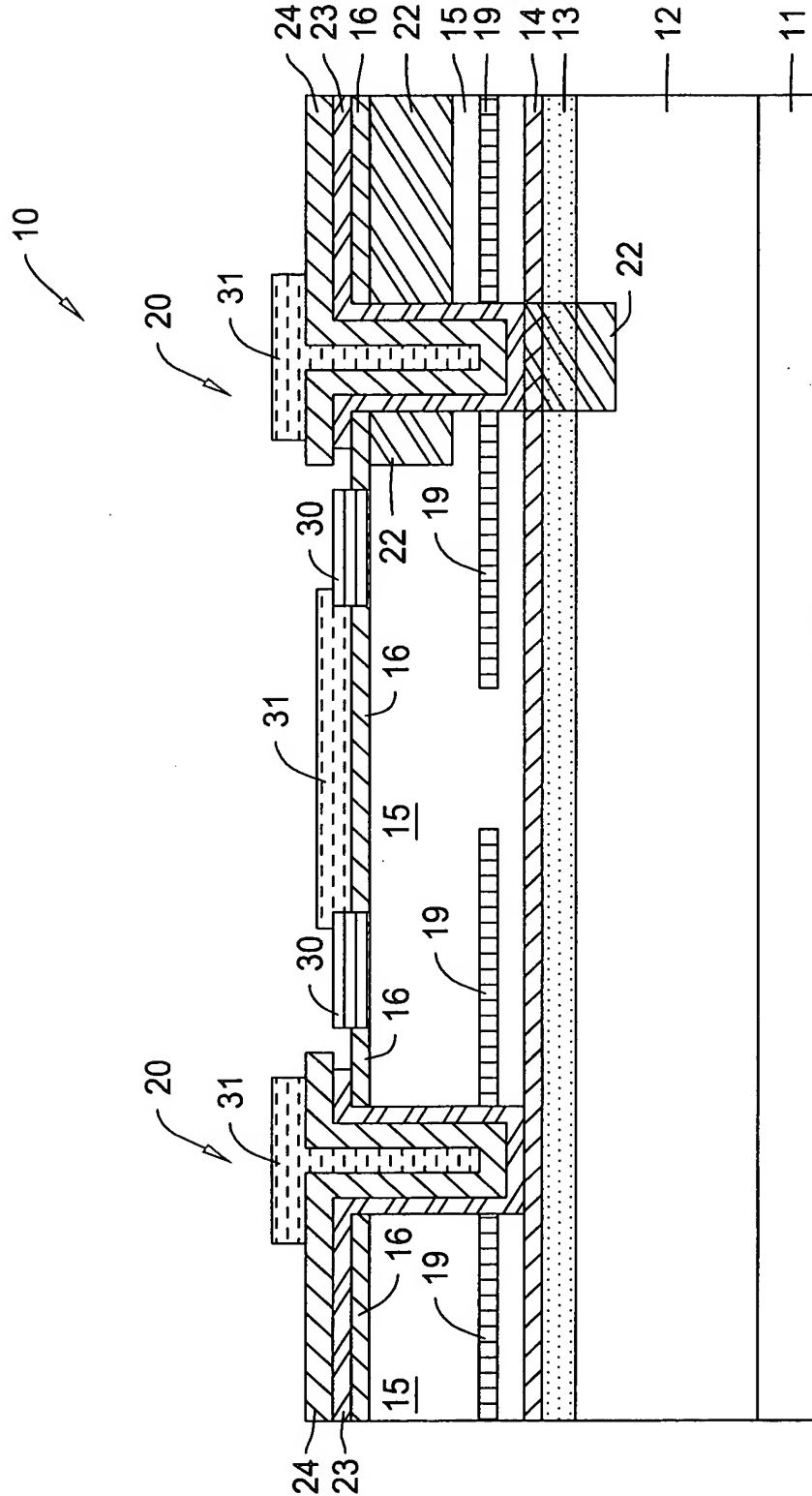


Figure 20

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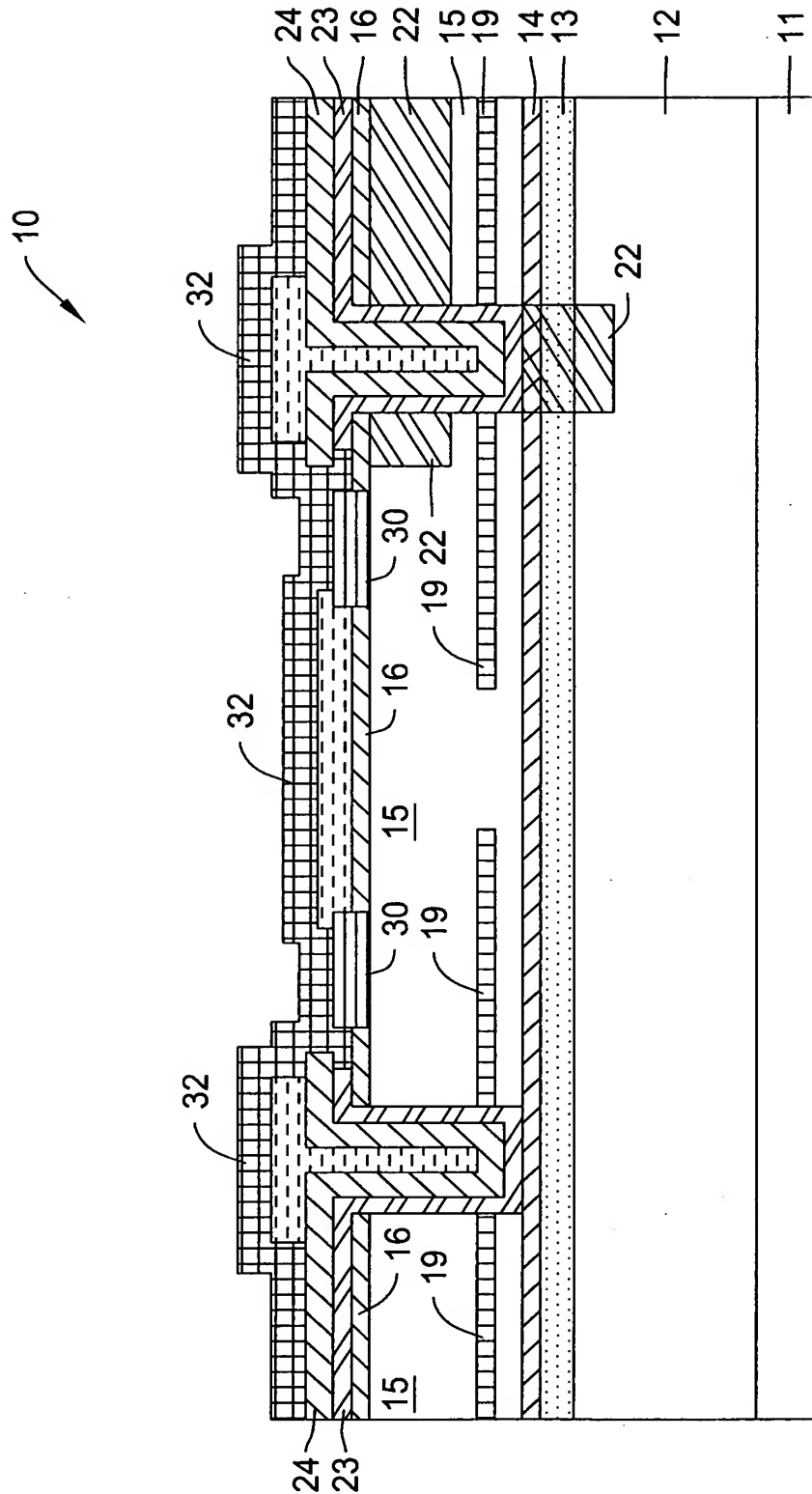


Figure 21

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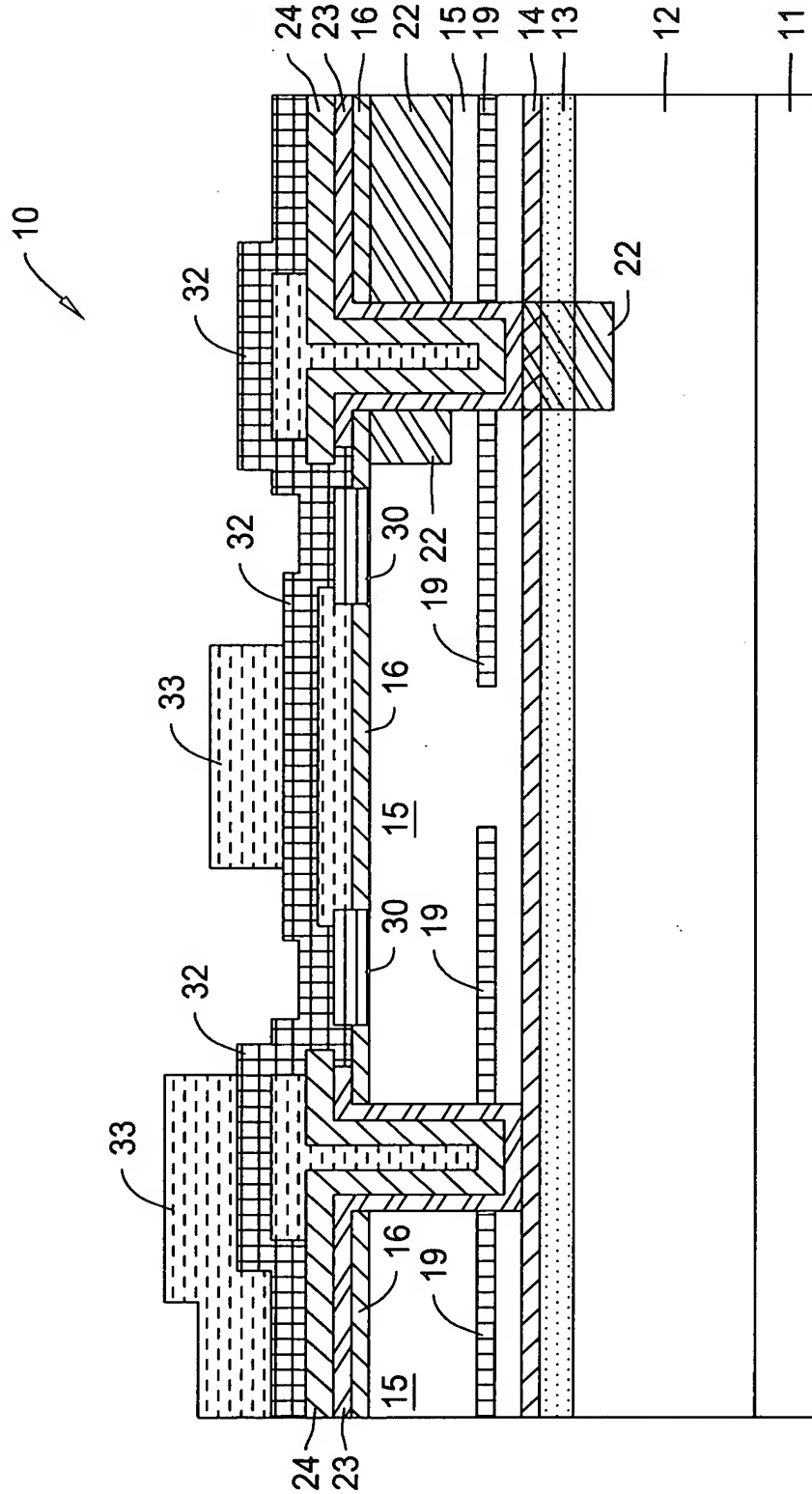


Figure 22

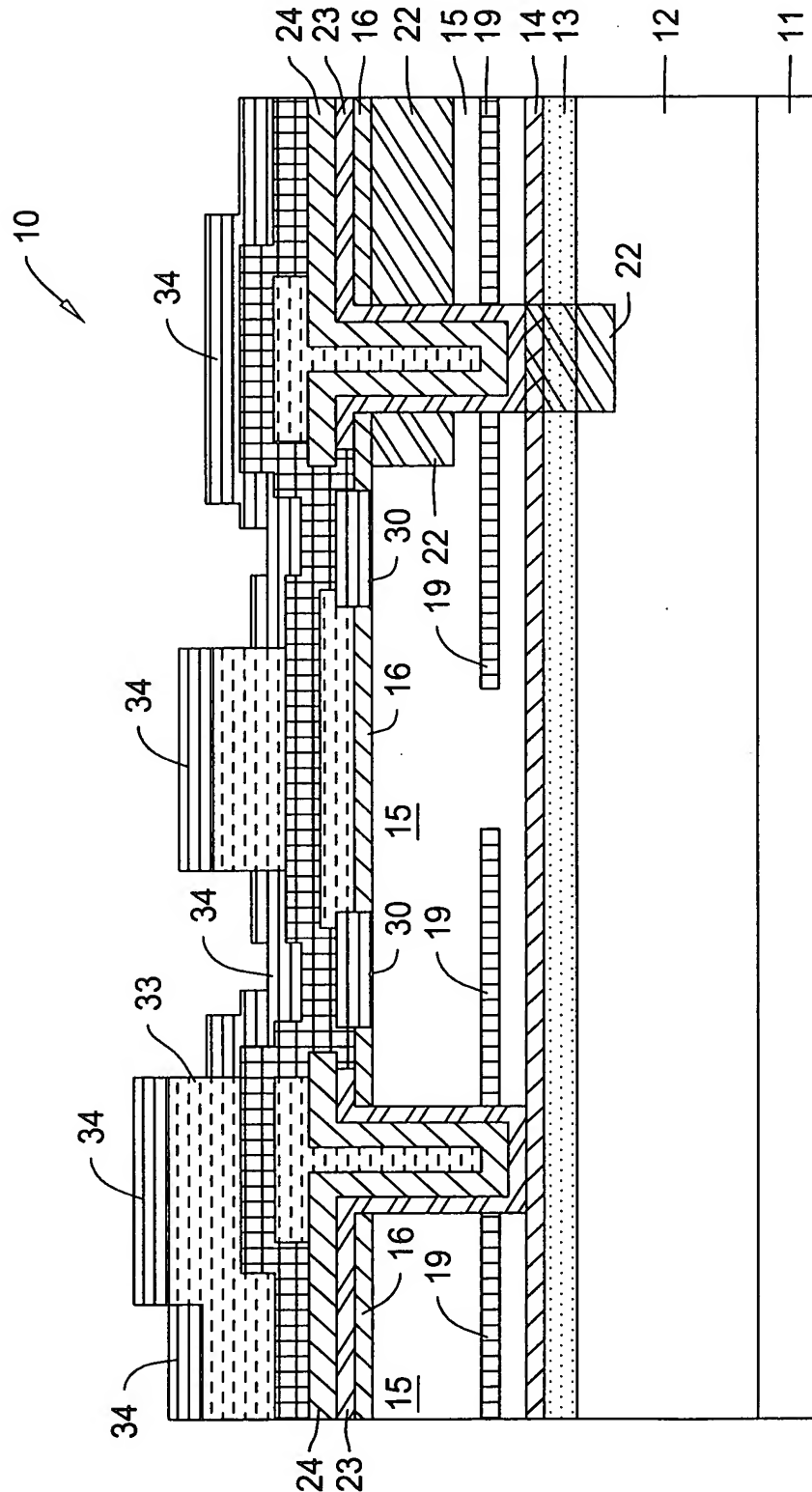


Figure 23

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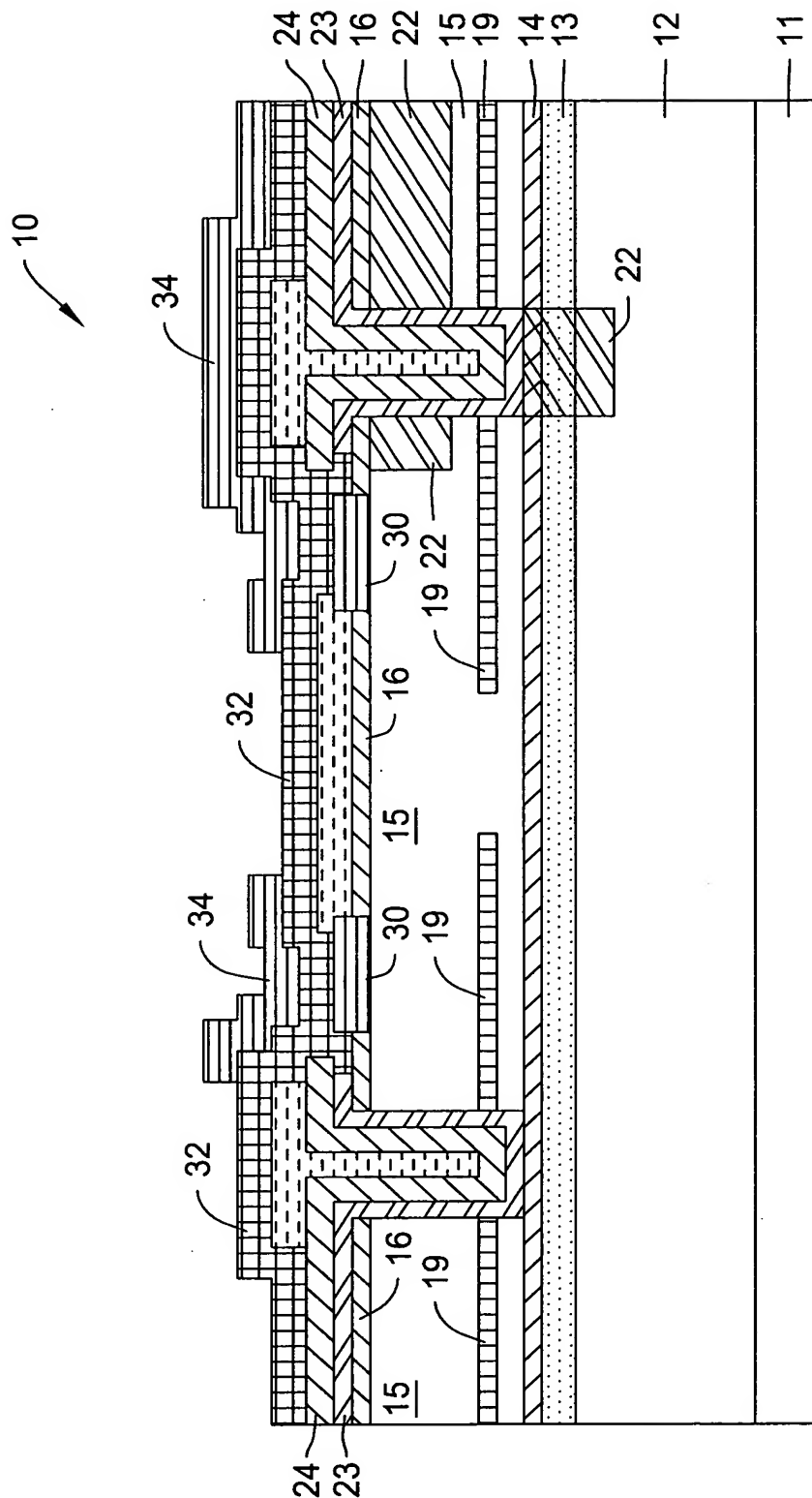


Figure 24

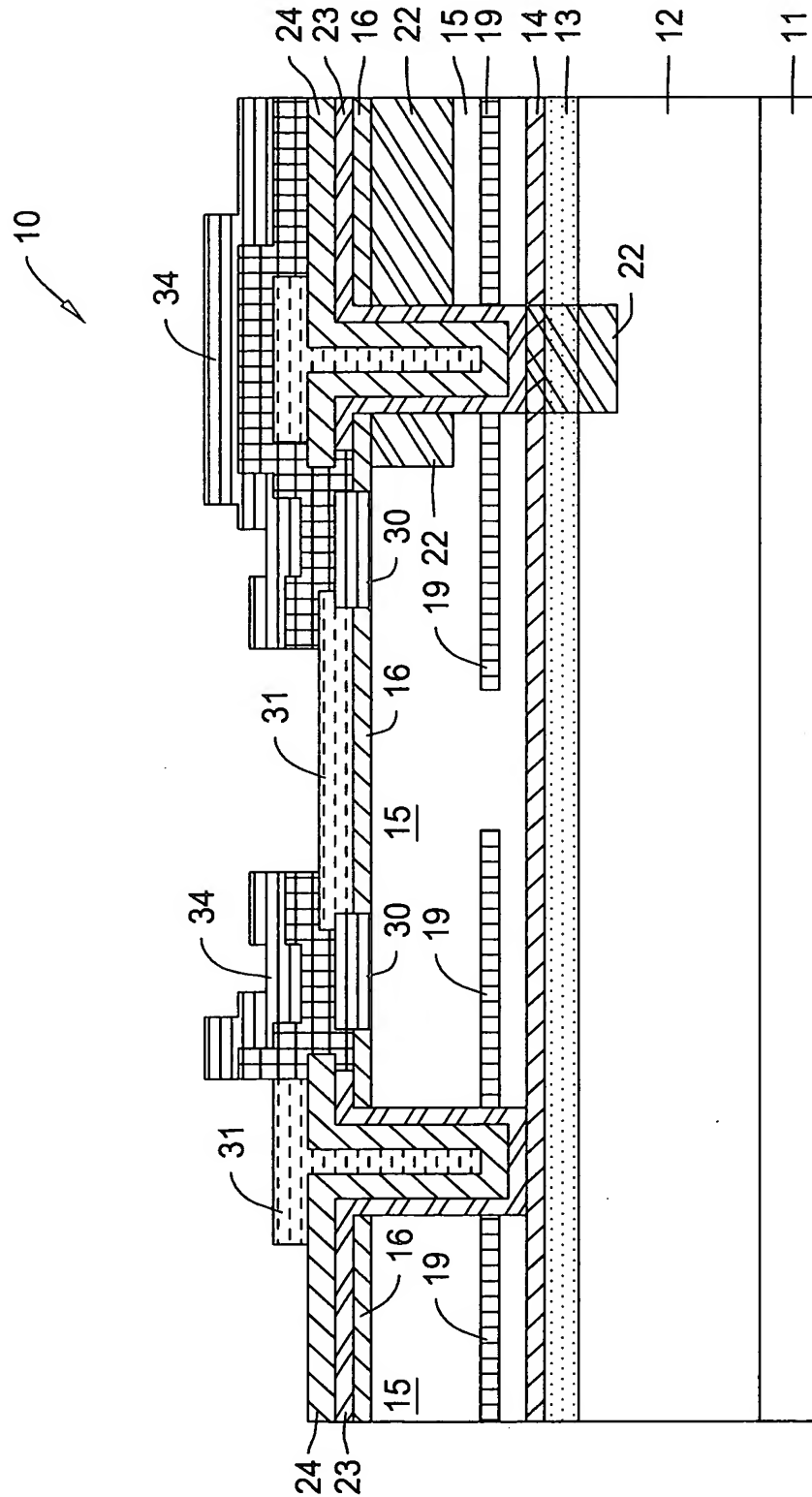


Figure 25

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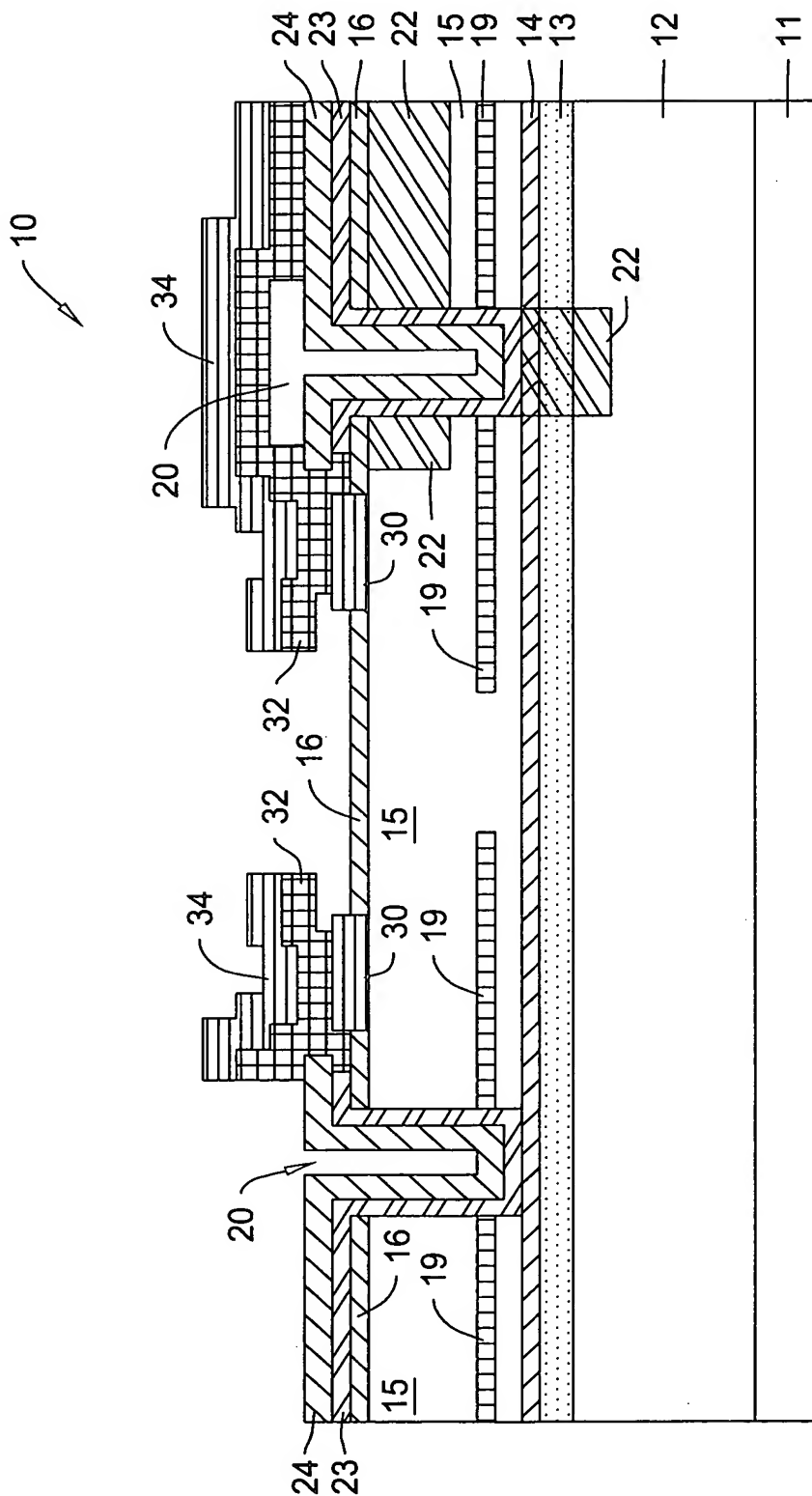


Figure 26

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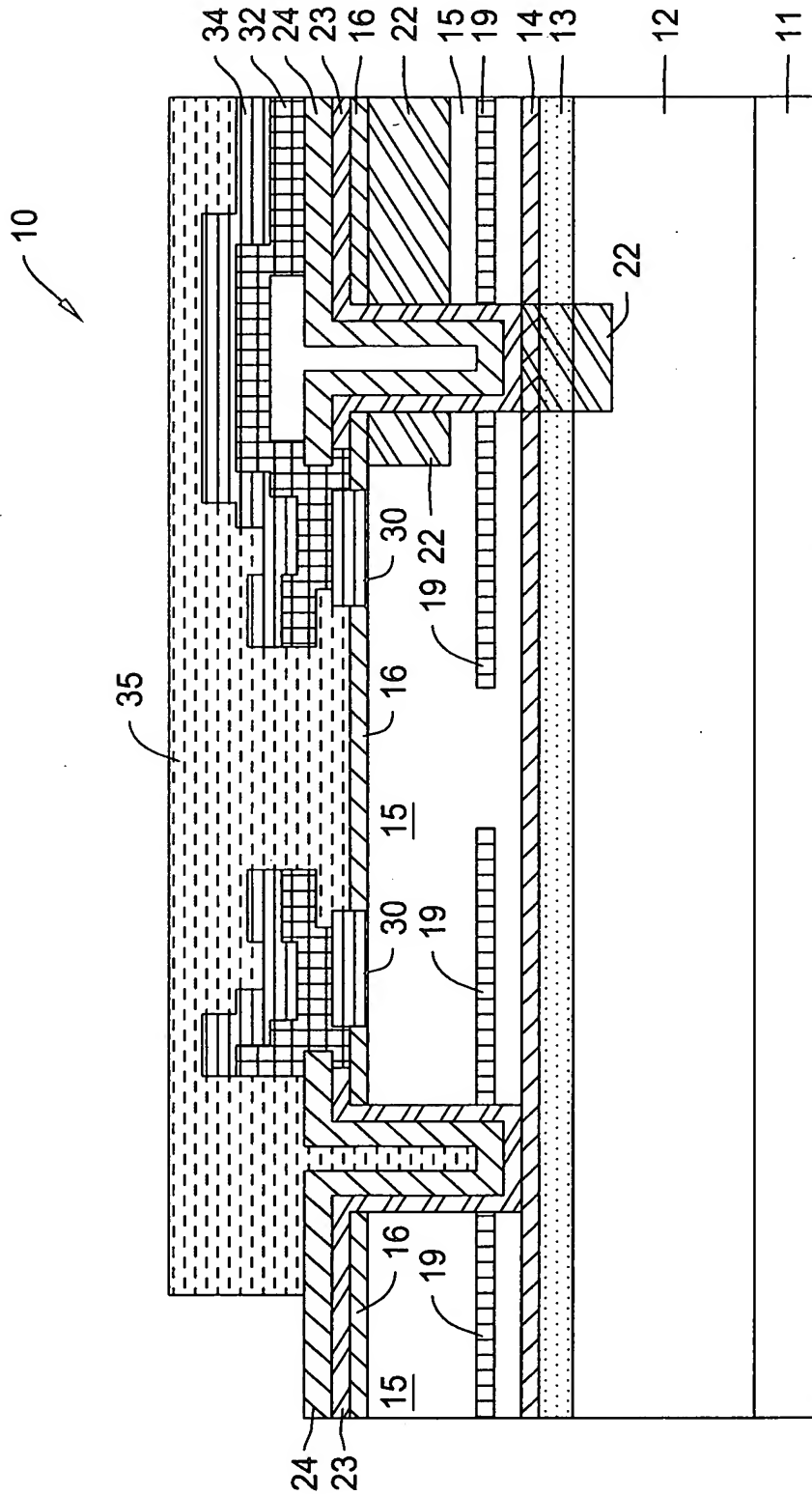


Figure 27



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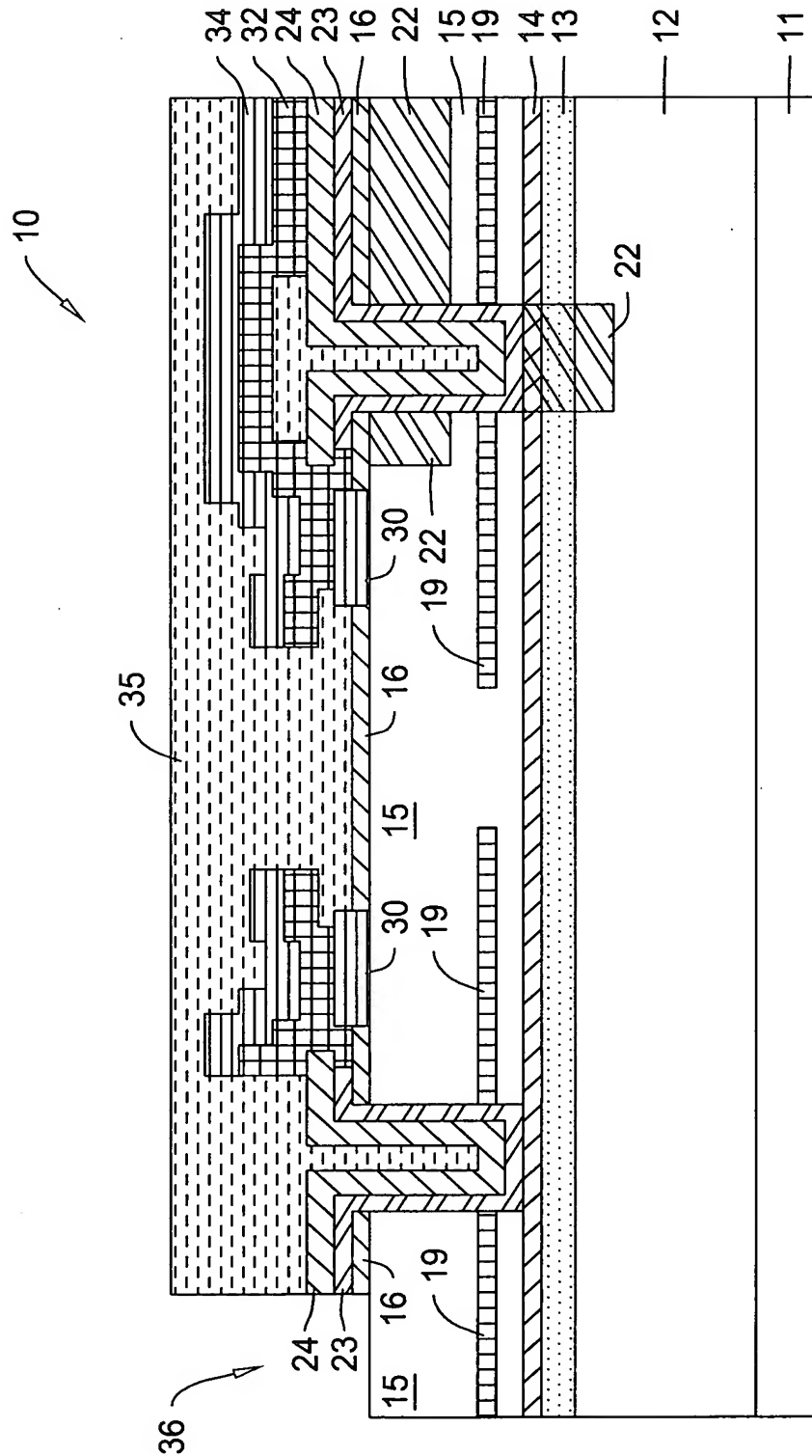


Figure 28

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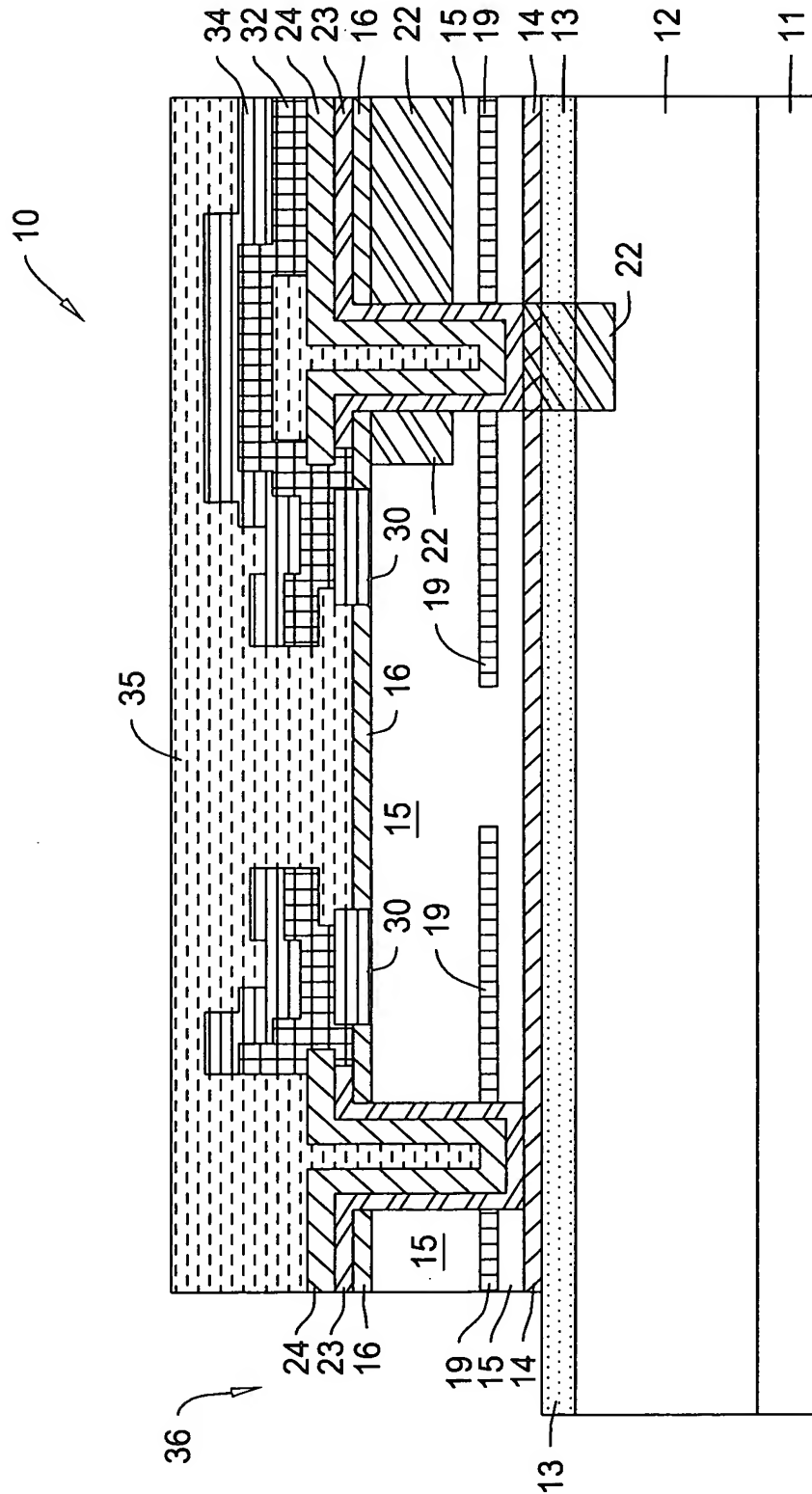


Figure 29

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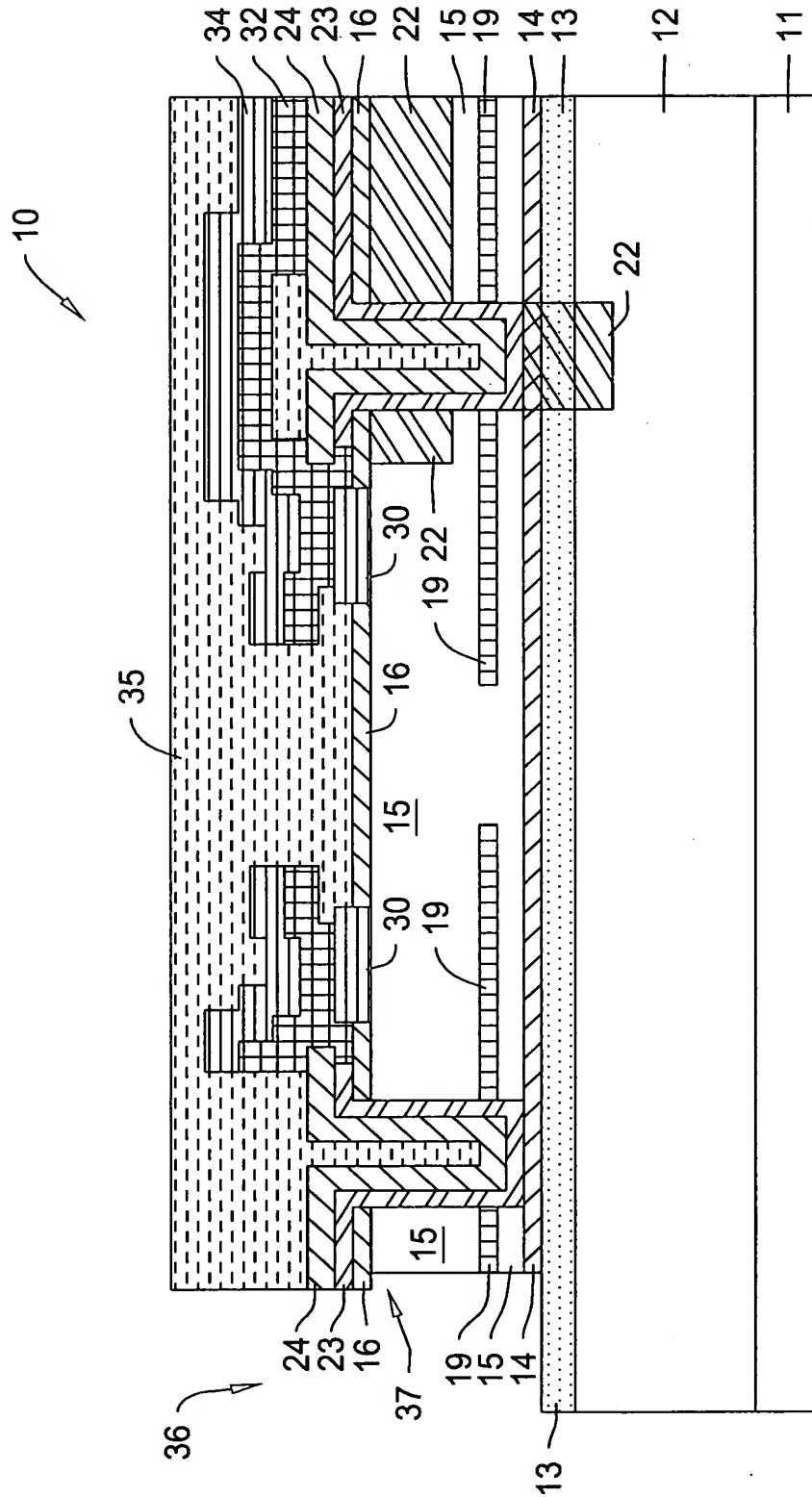


Figure 30

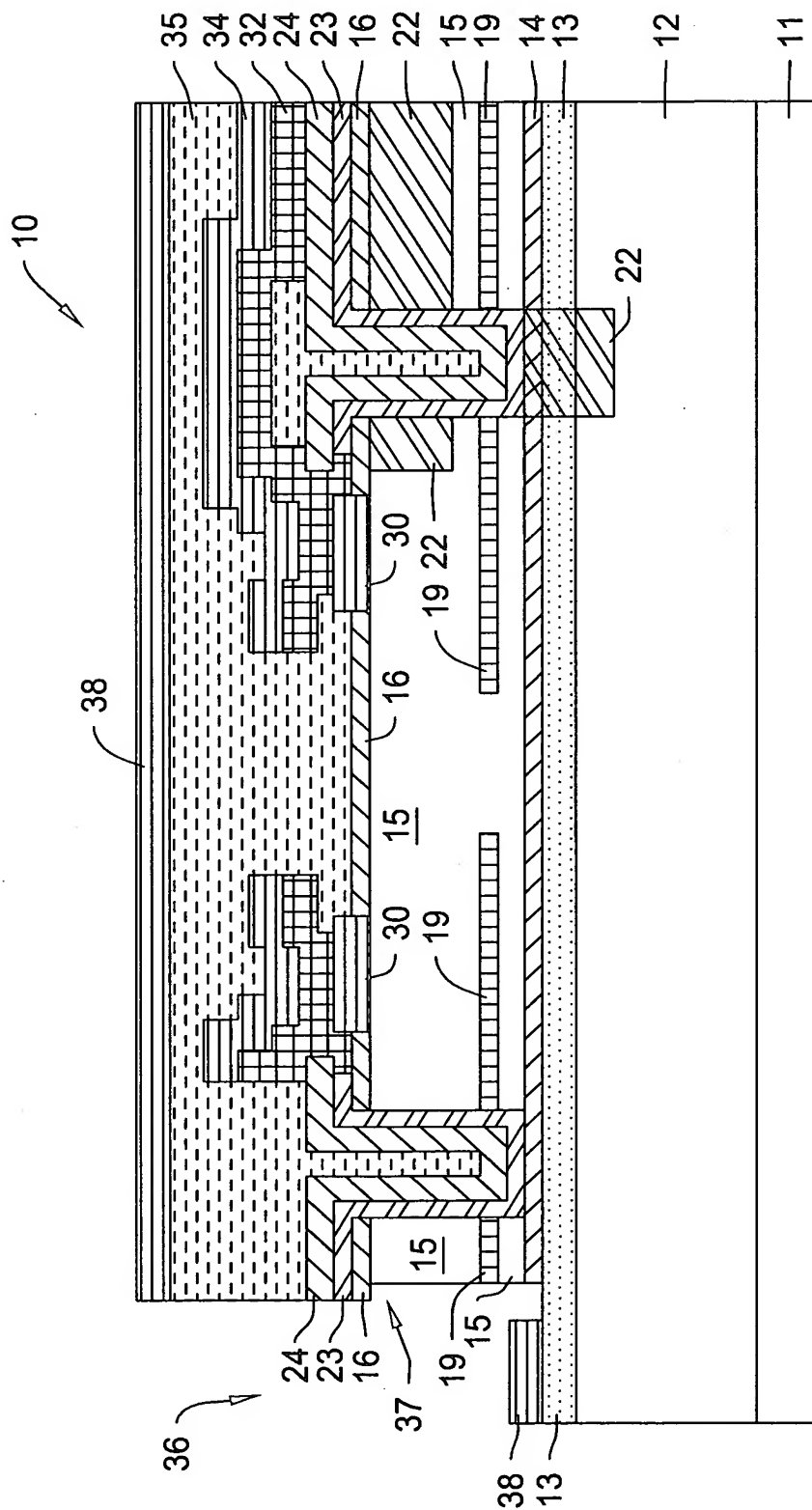


Figure 31

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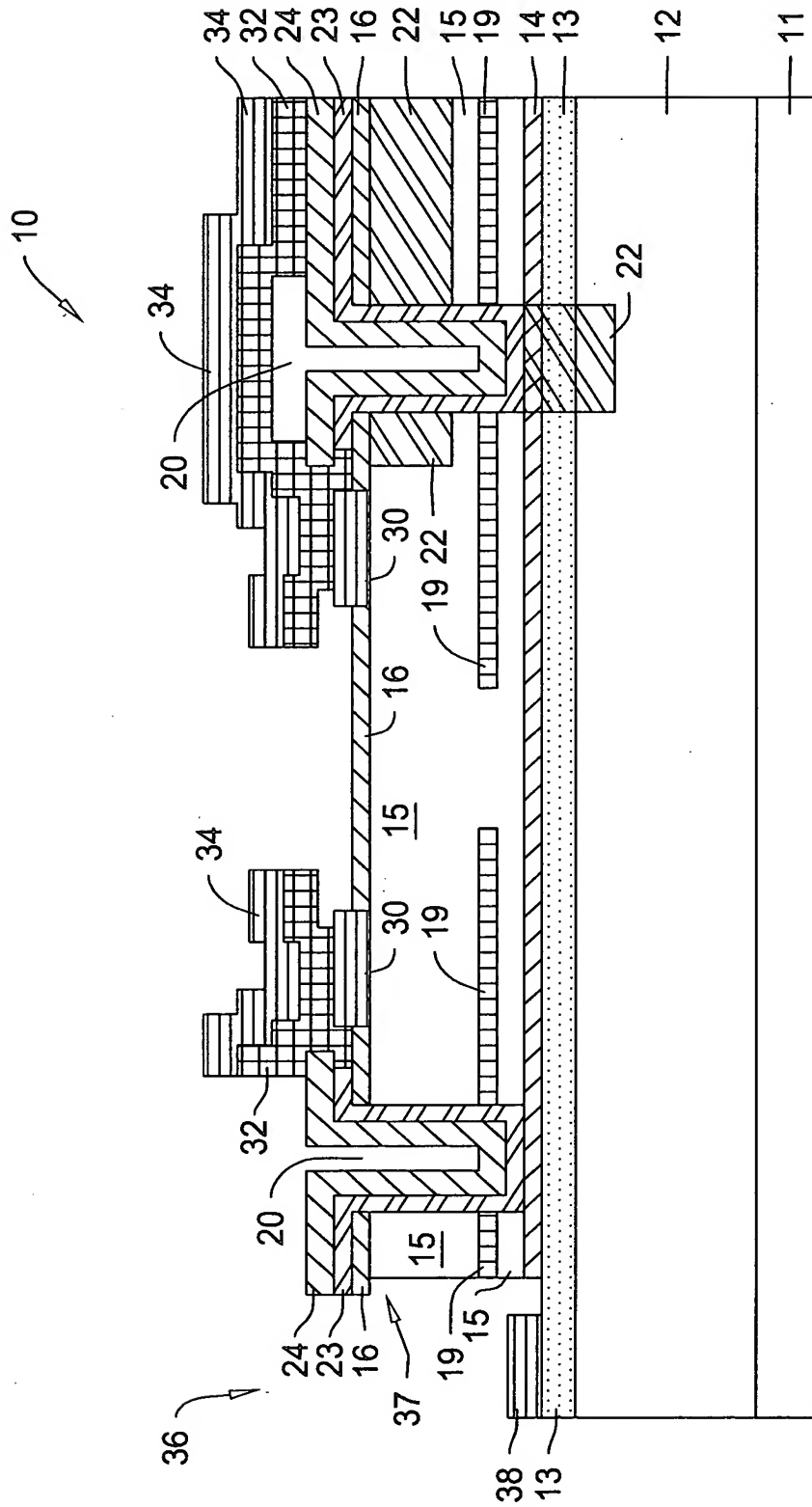


Figure 32

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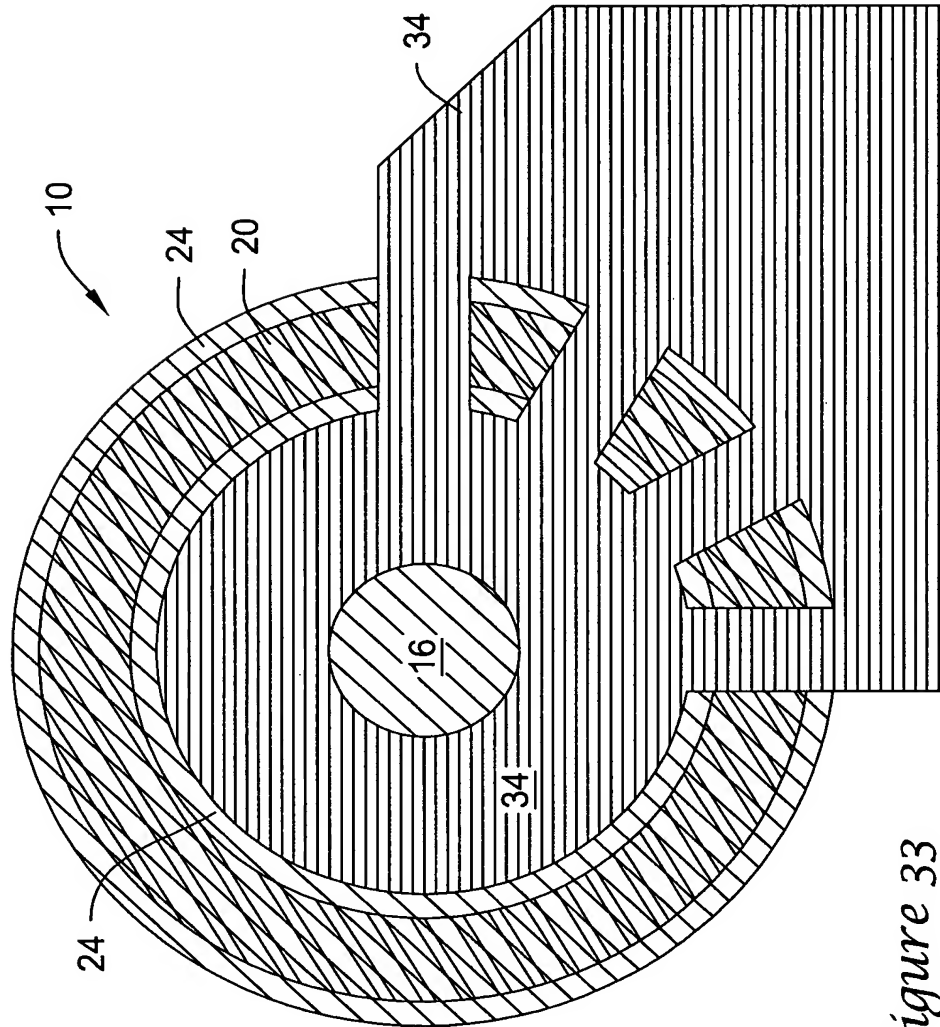


Figure 33

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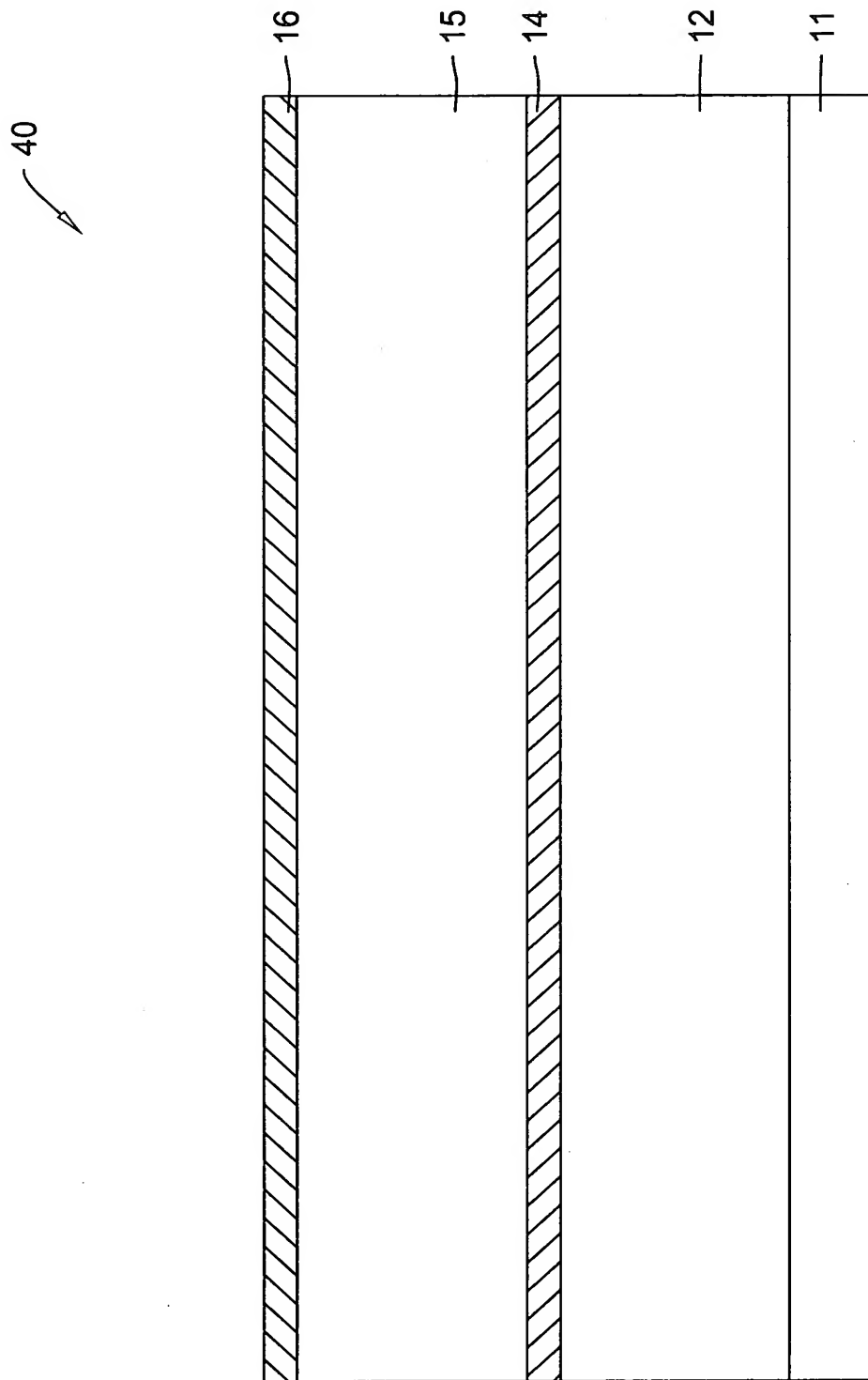


Figure 34





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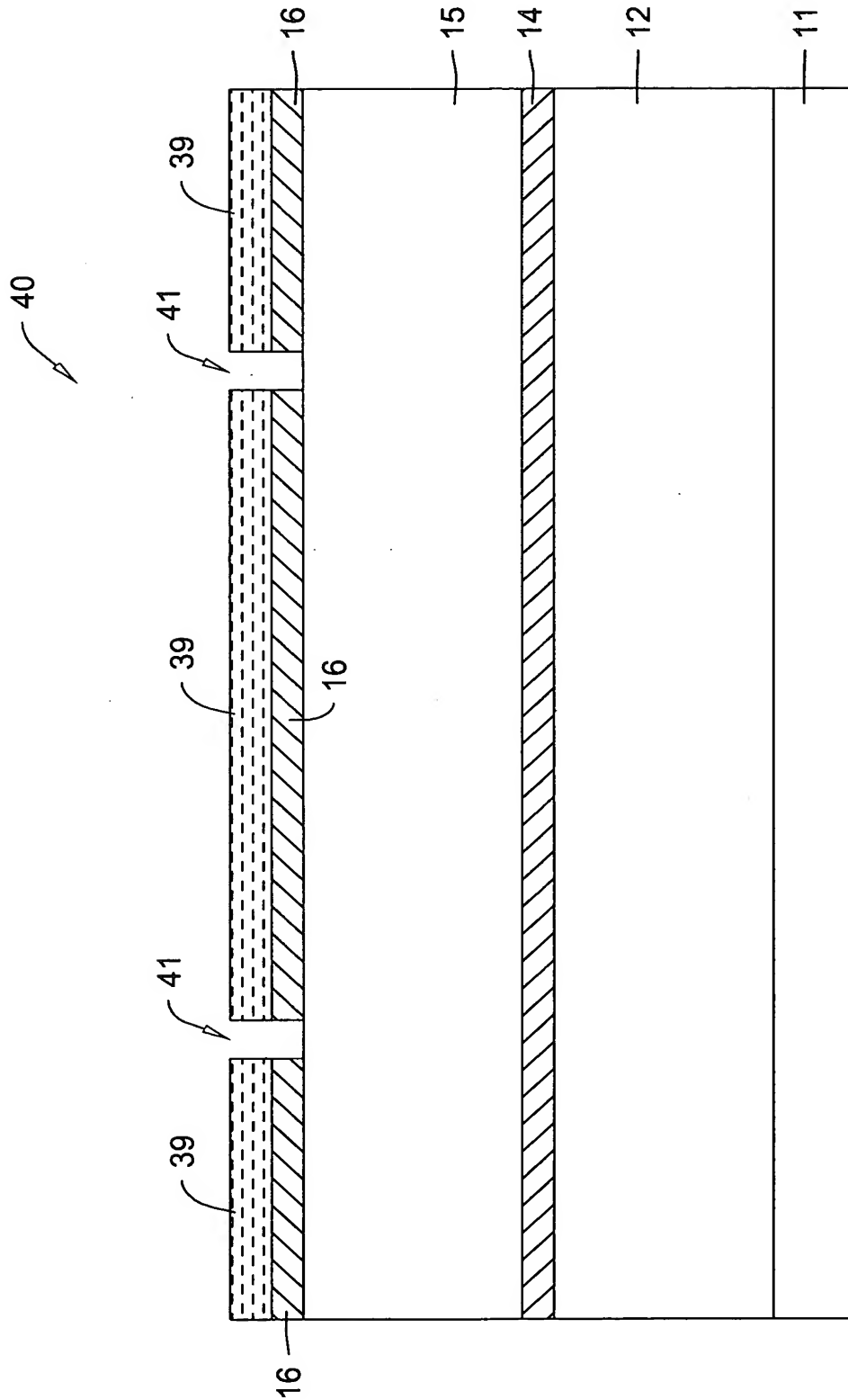


Figure 36

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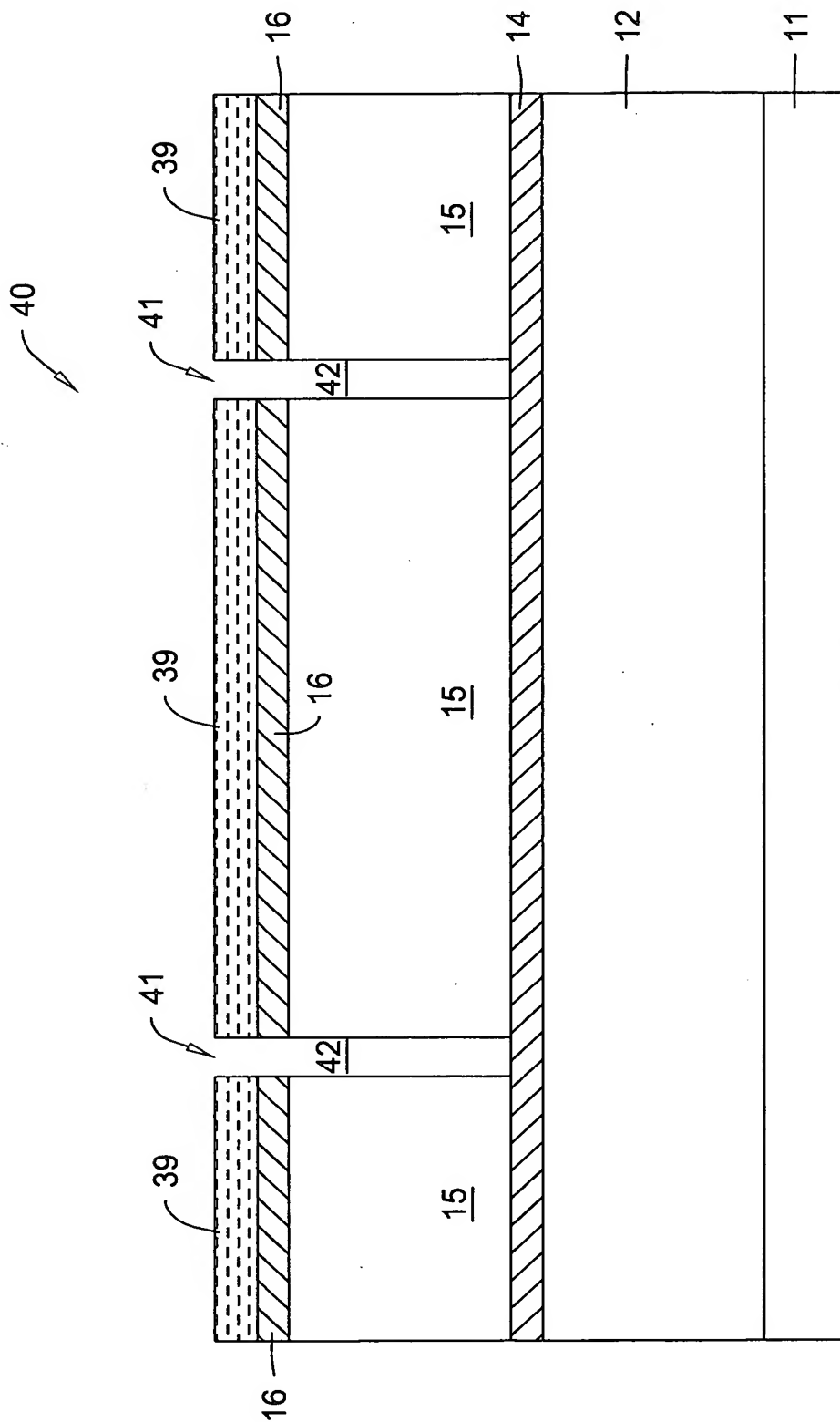


Figure 37

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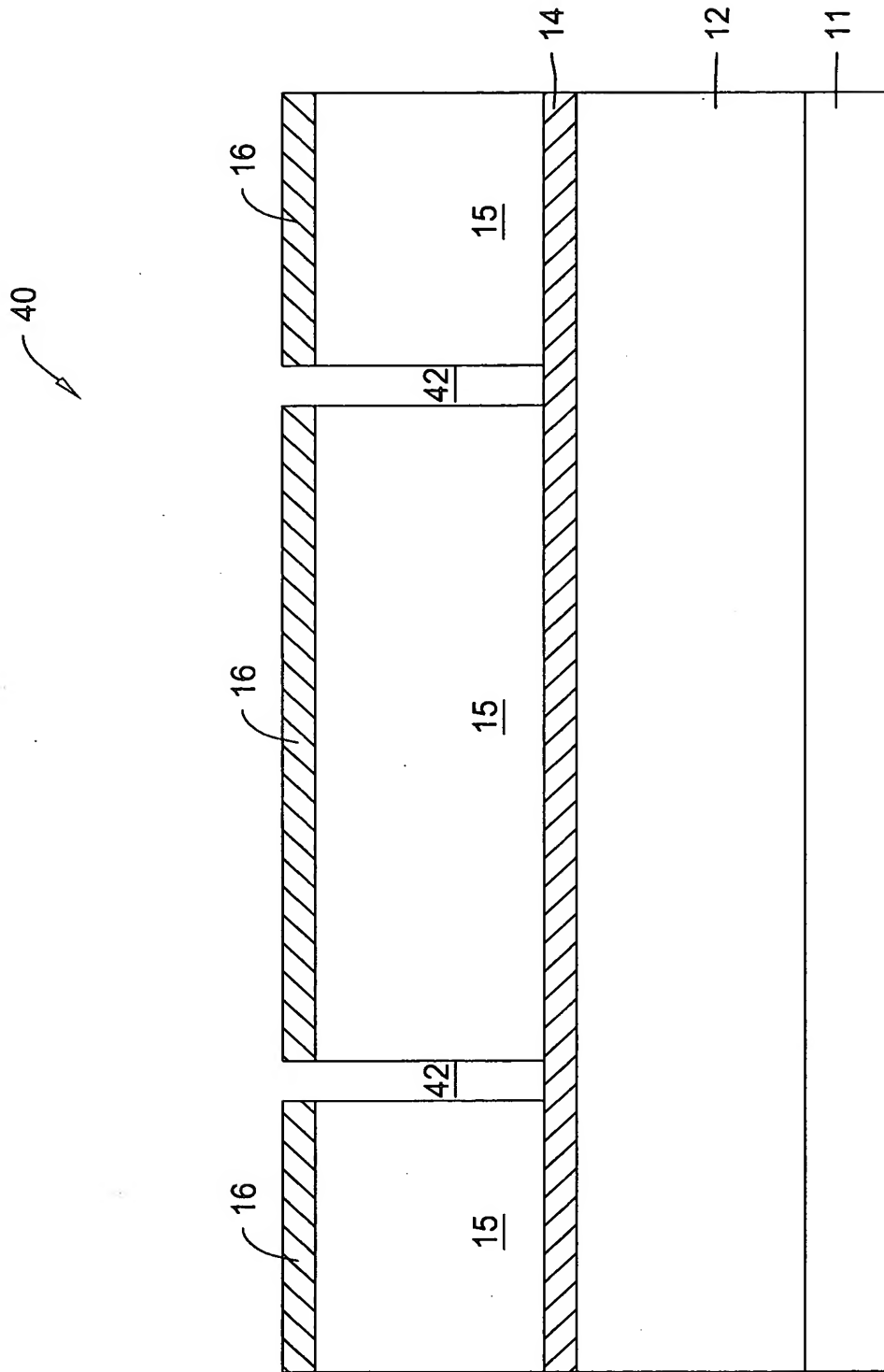


Figure 38

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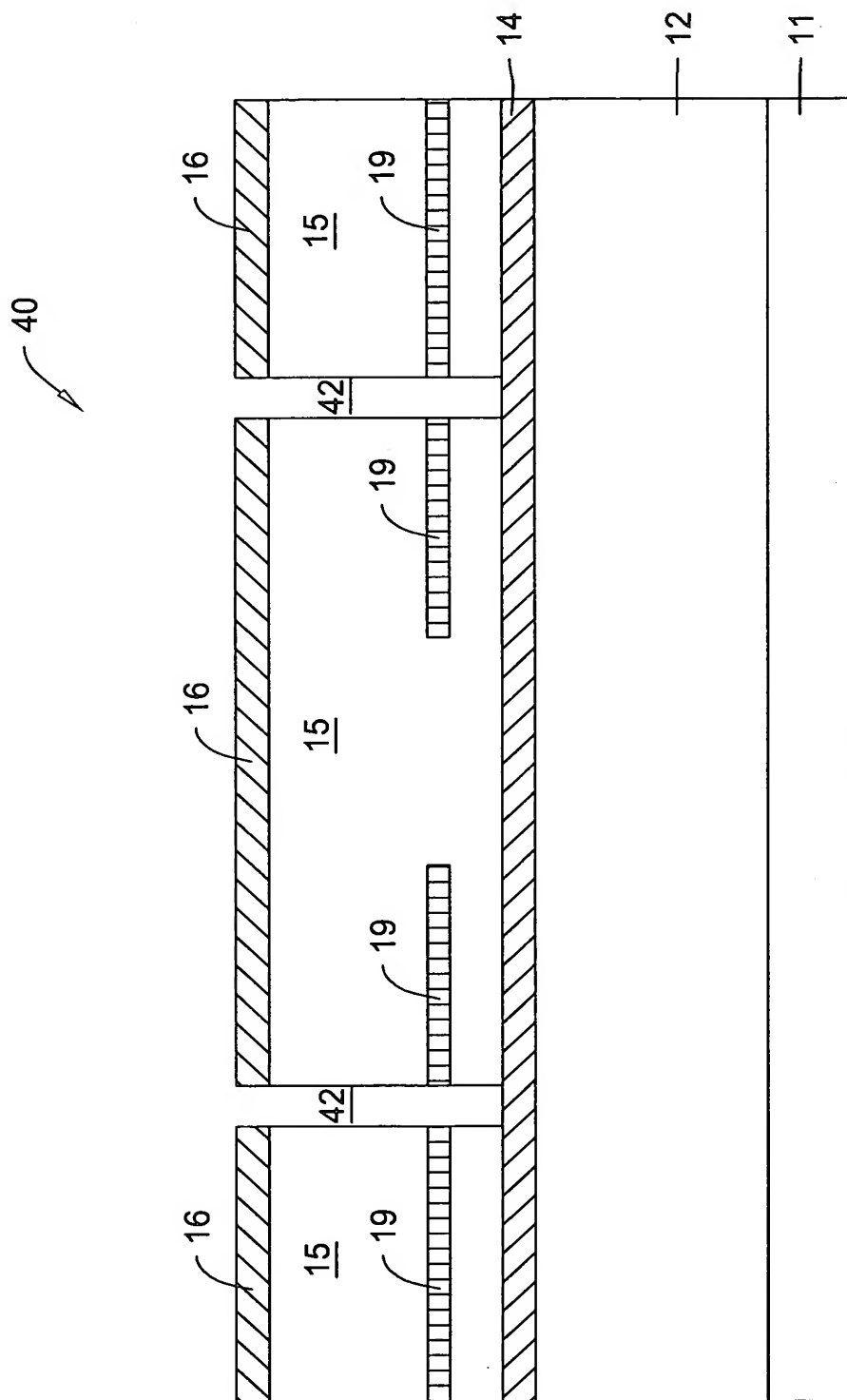


Figure 39

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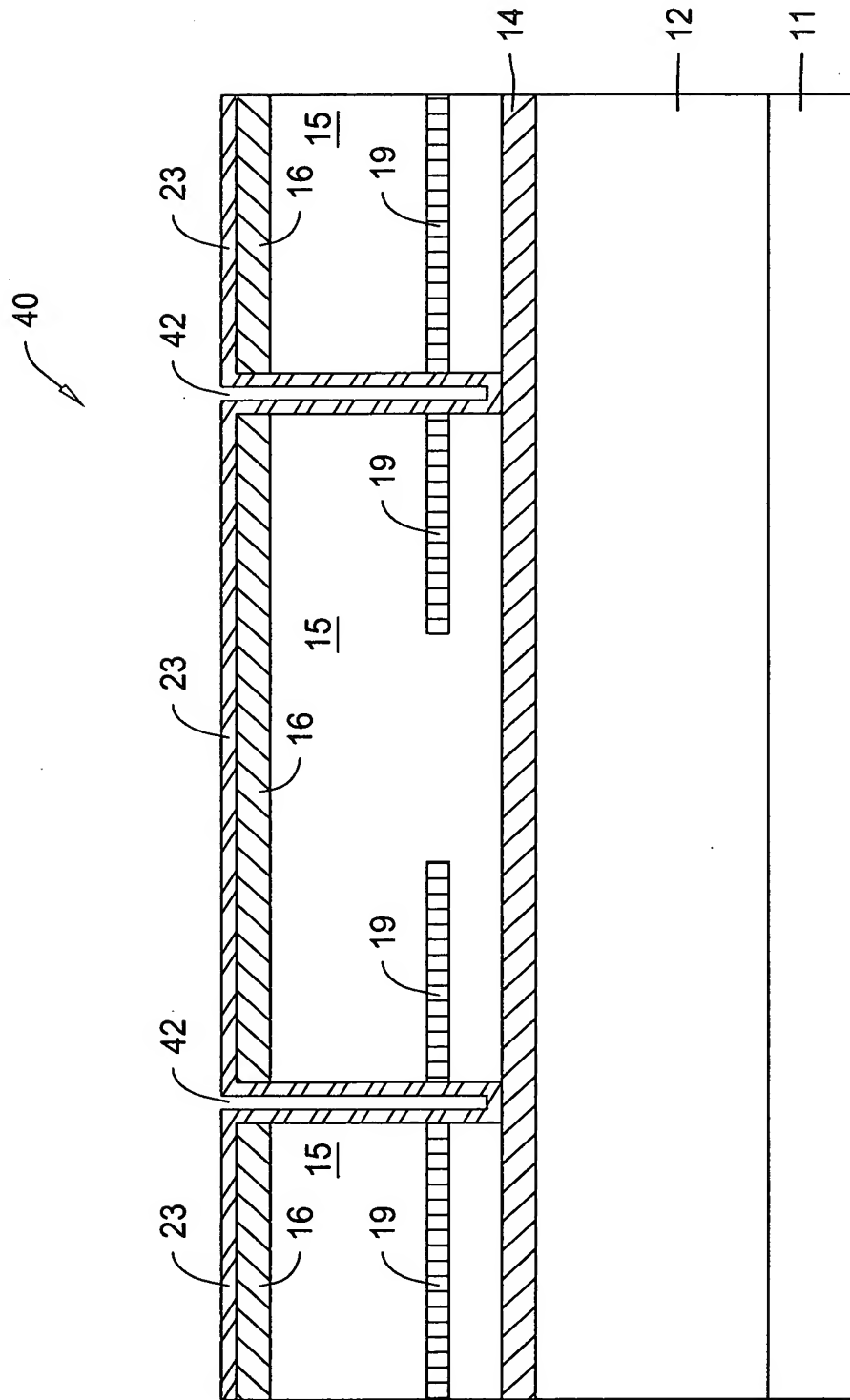


Figure 40

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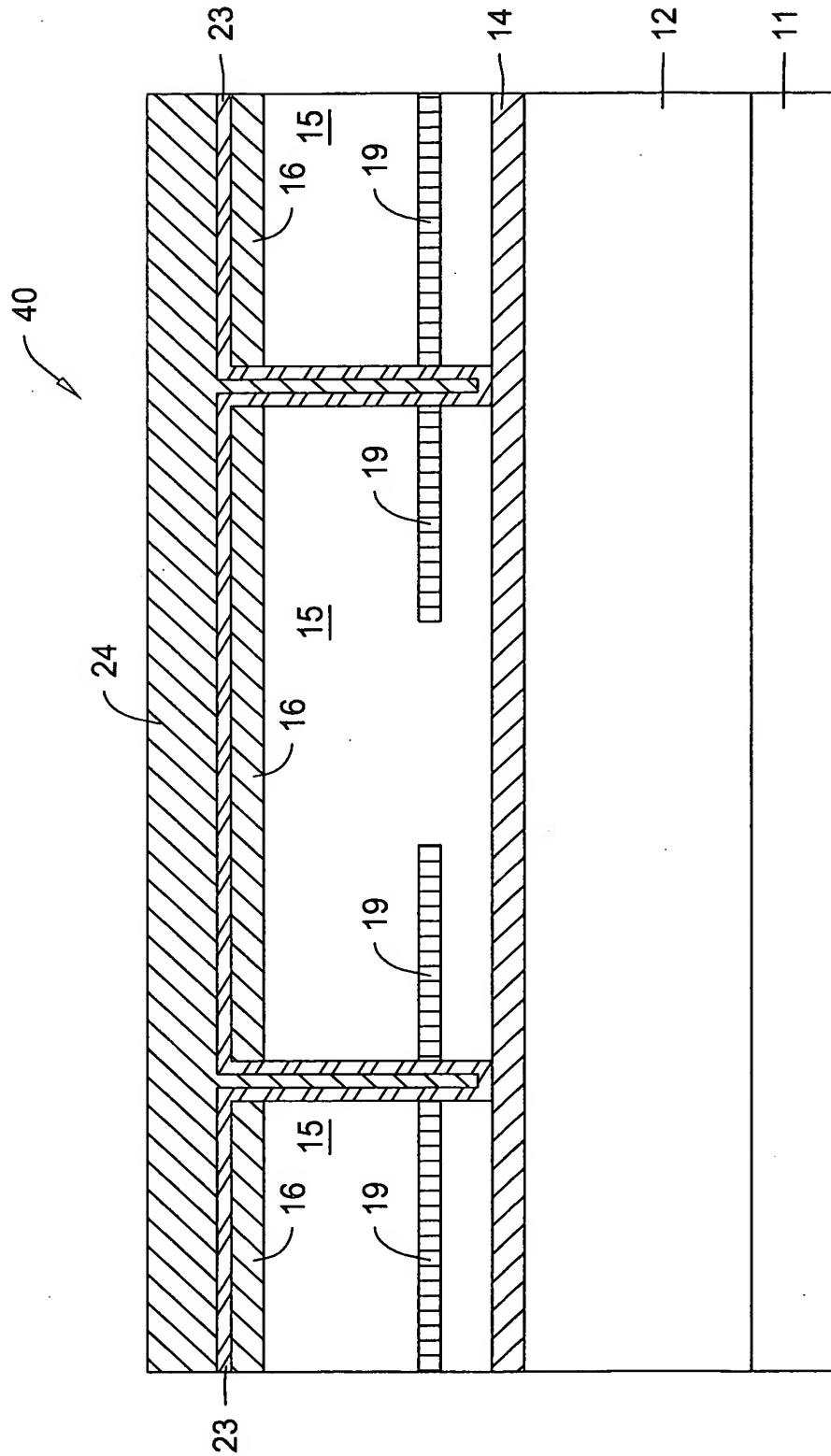


Figure 41

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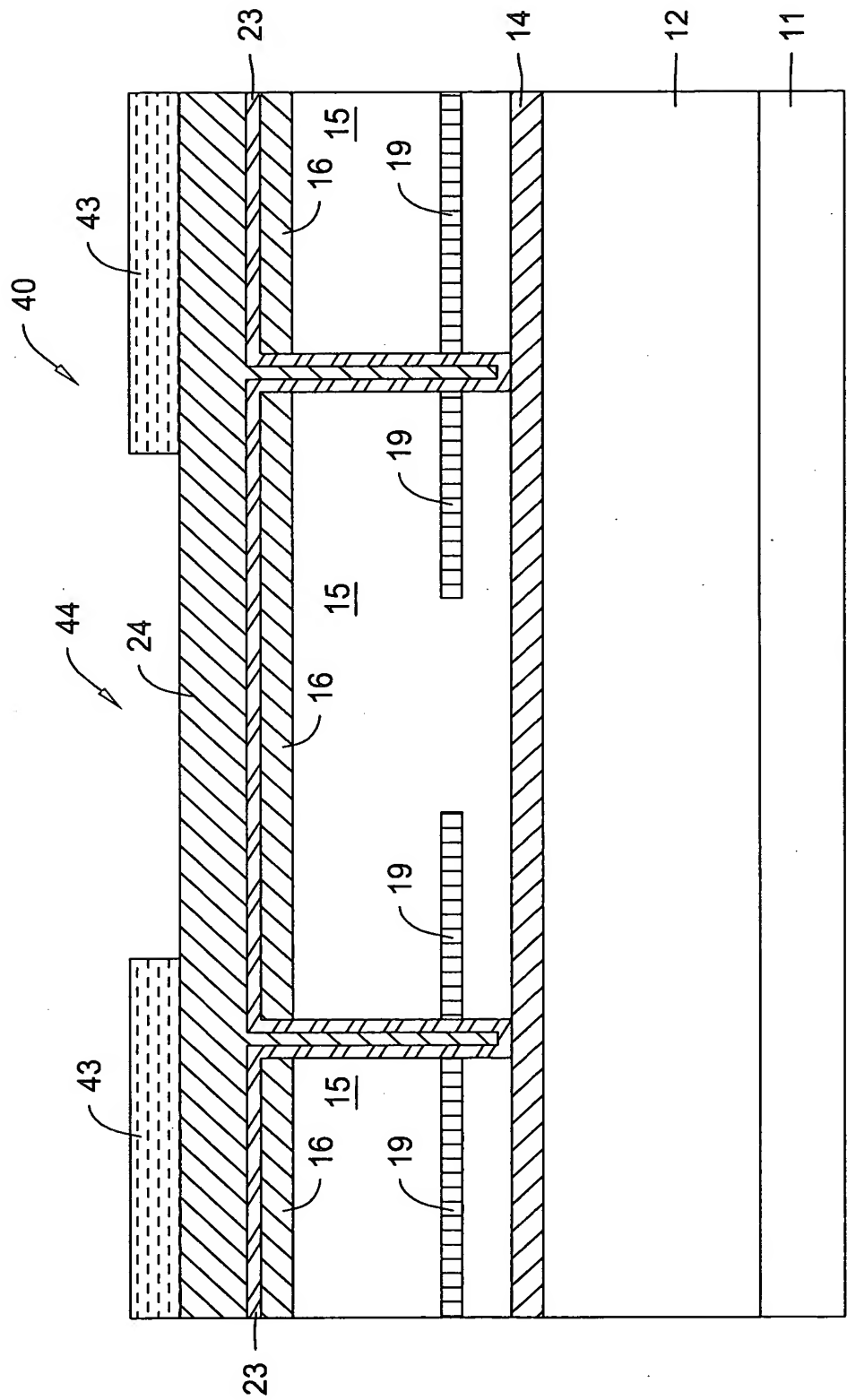


Figure 42

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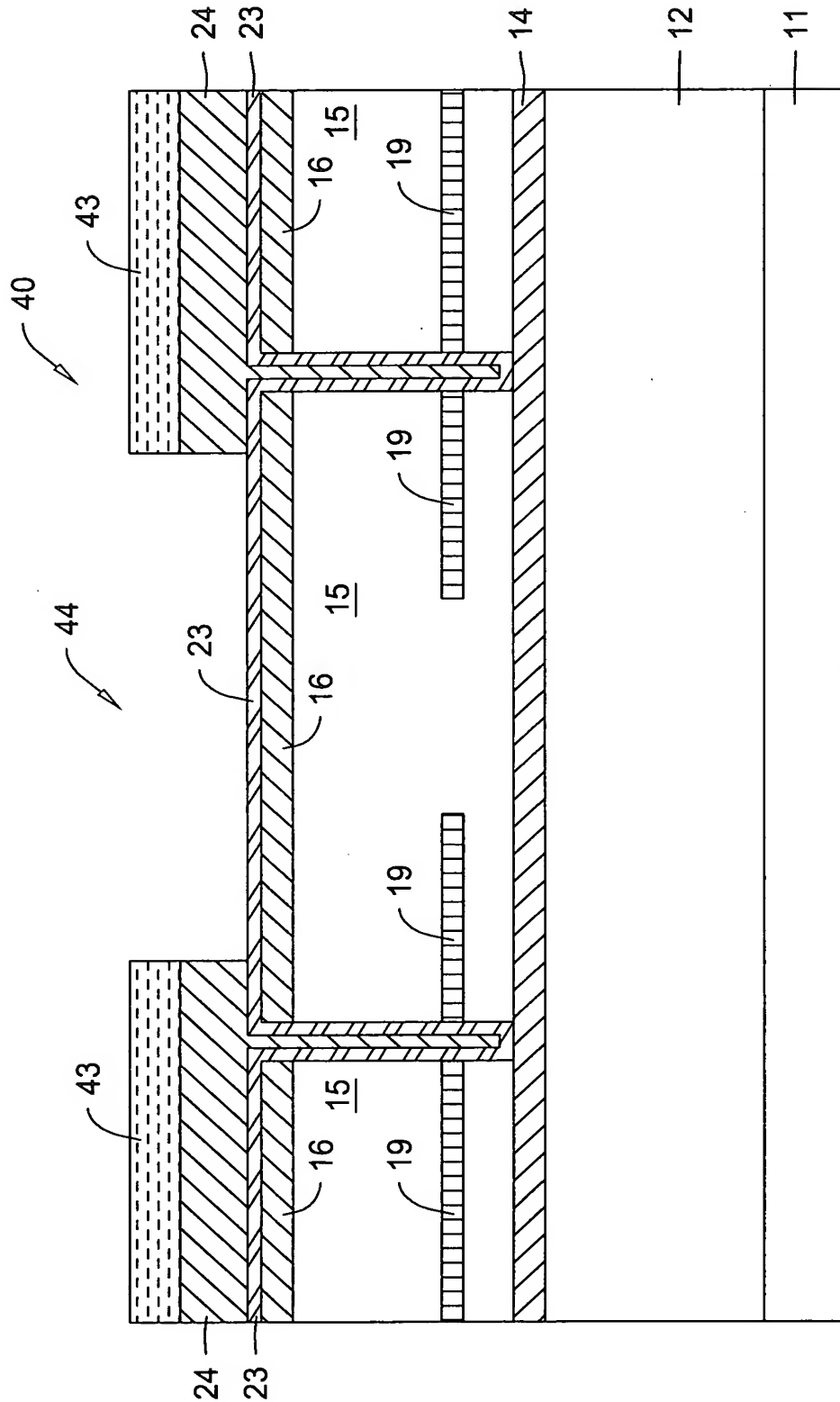


Figure 43



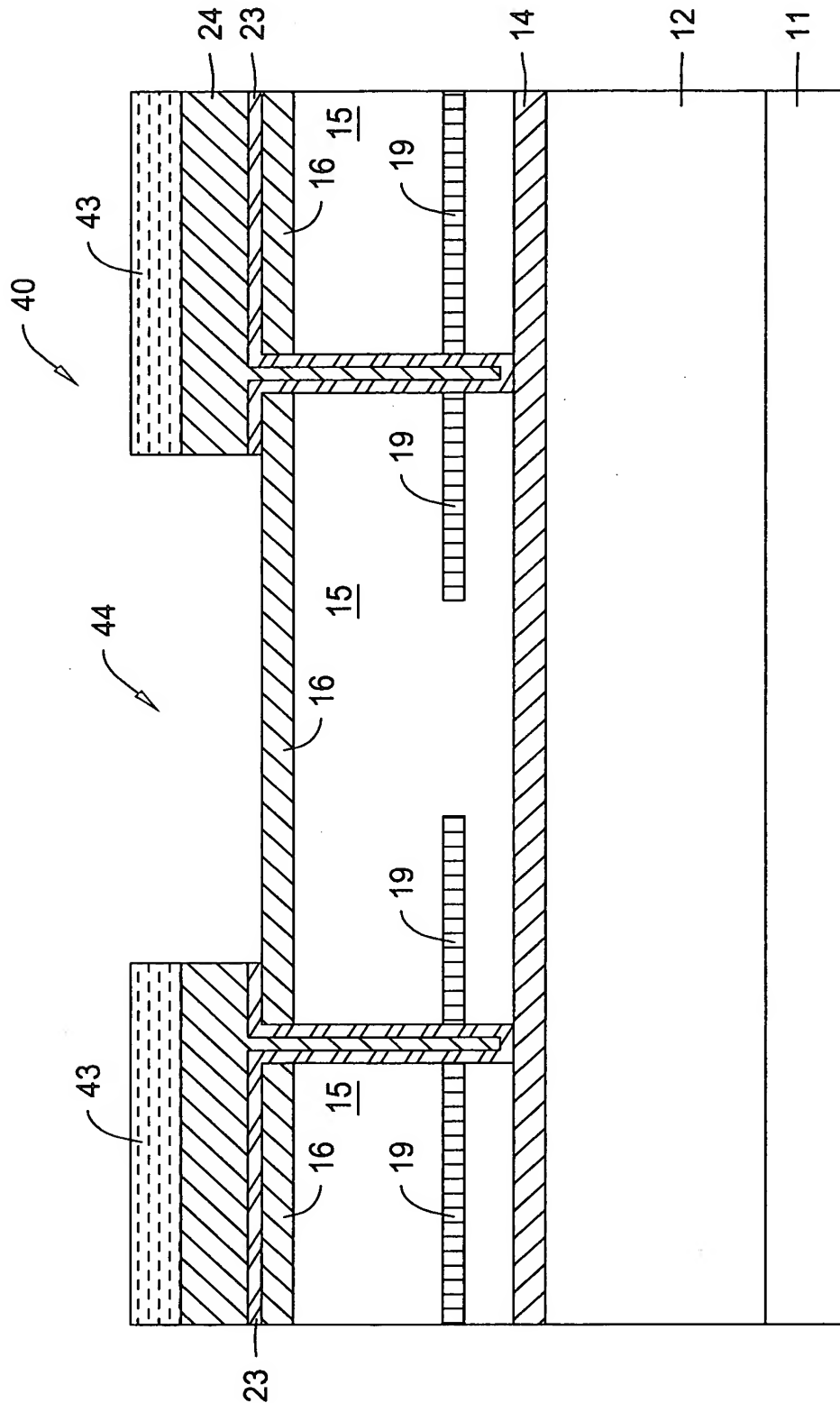


Figure 44

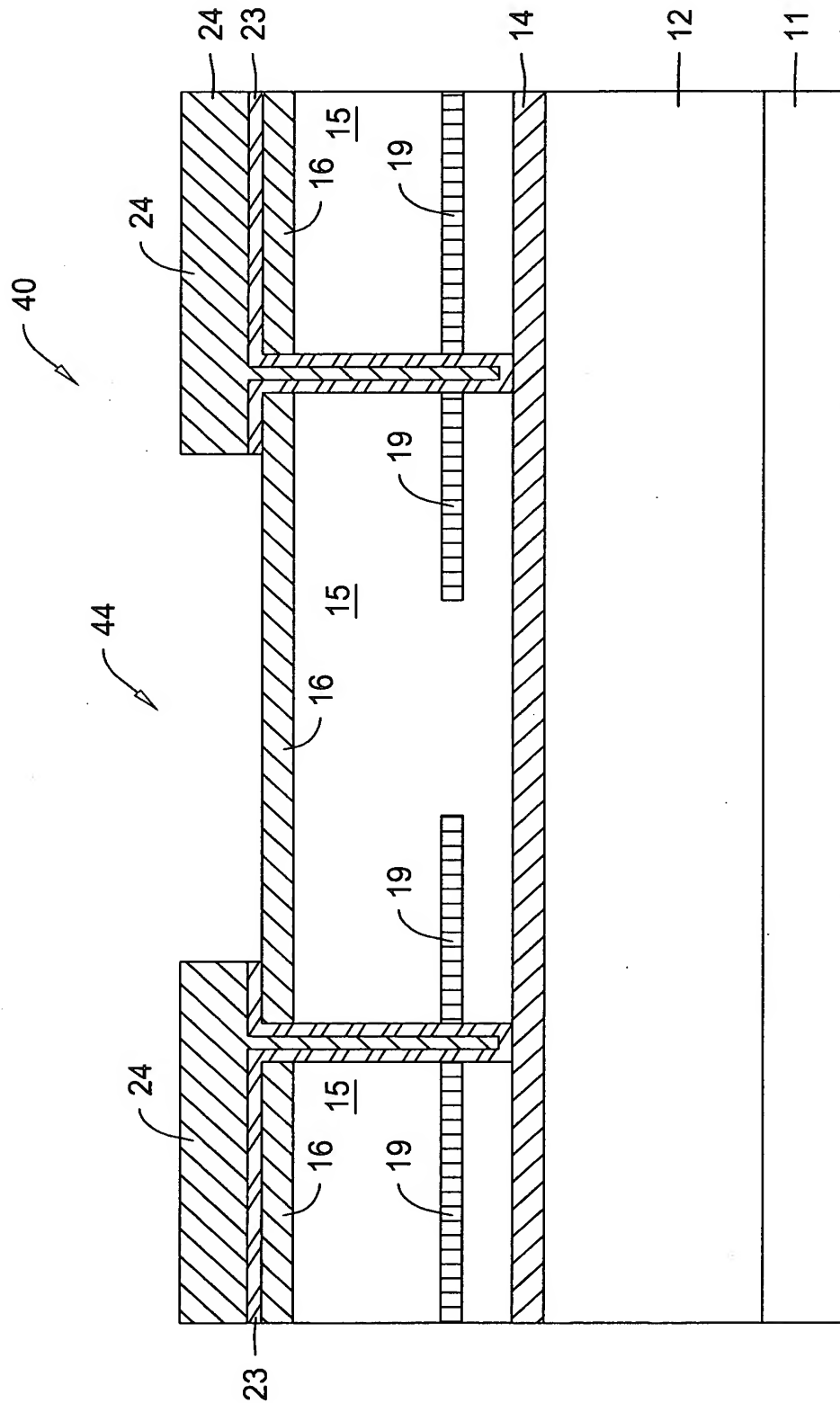


Figure 45

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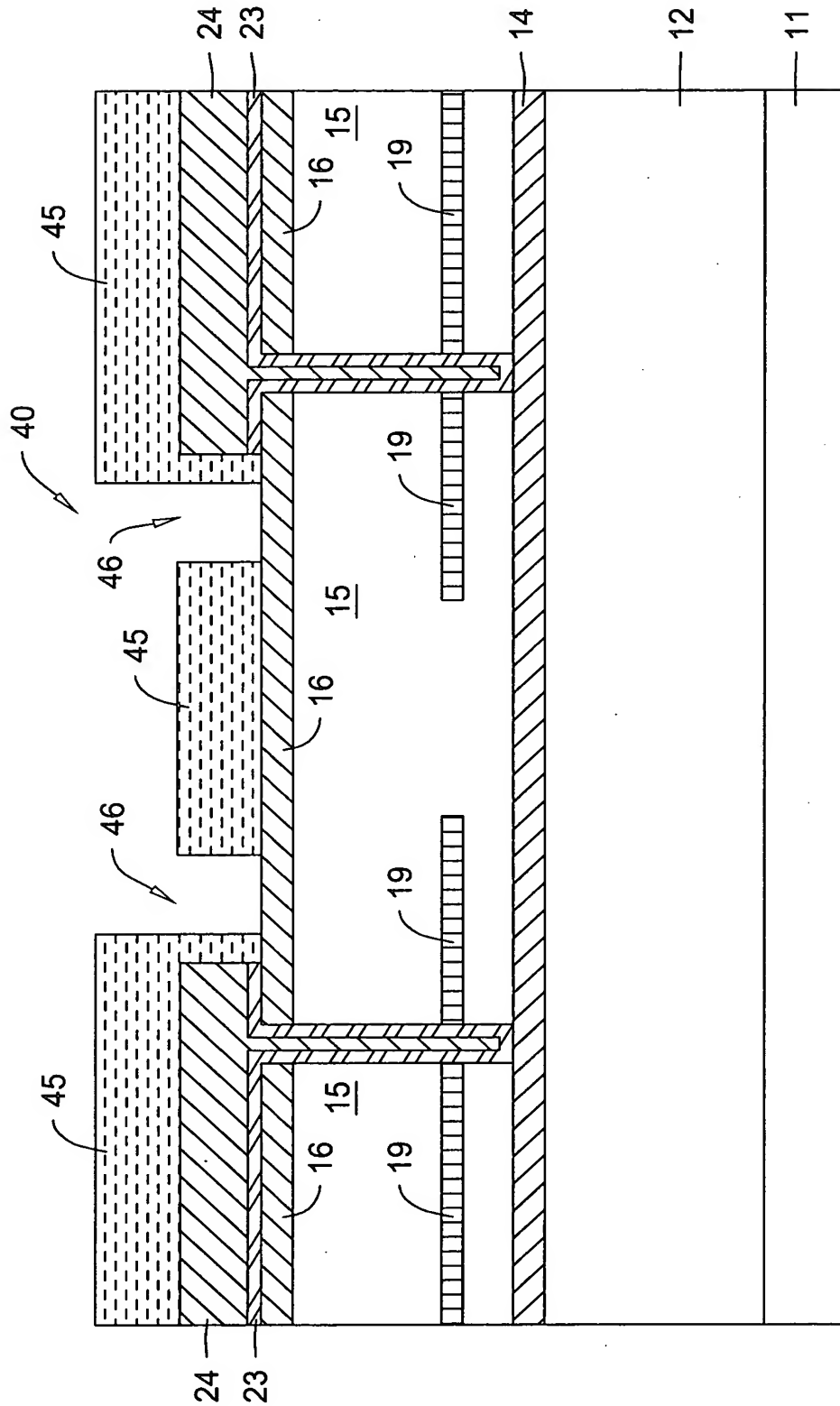


Figure 46

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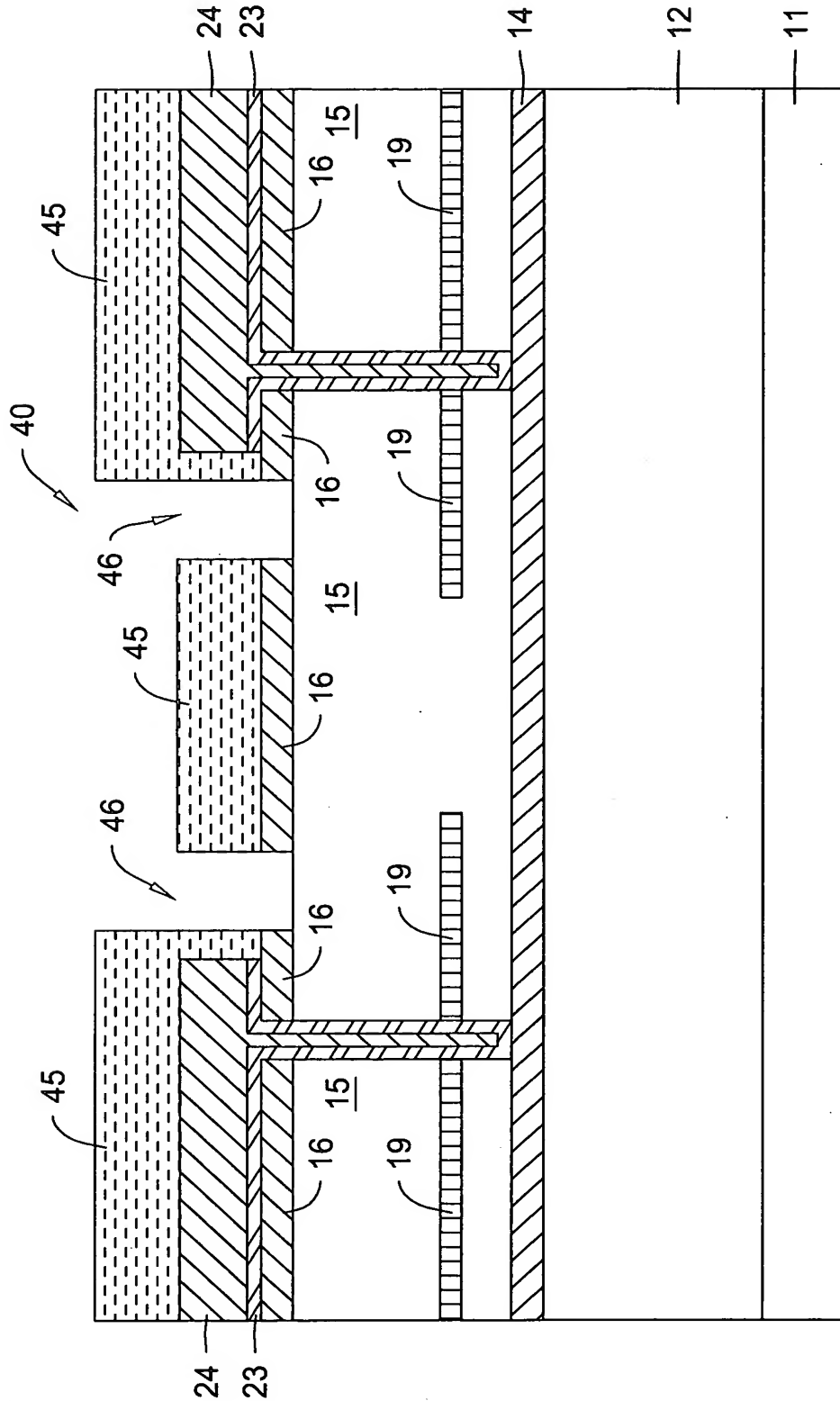


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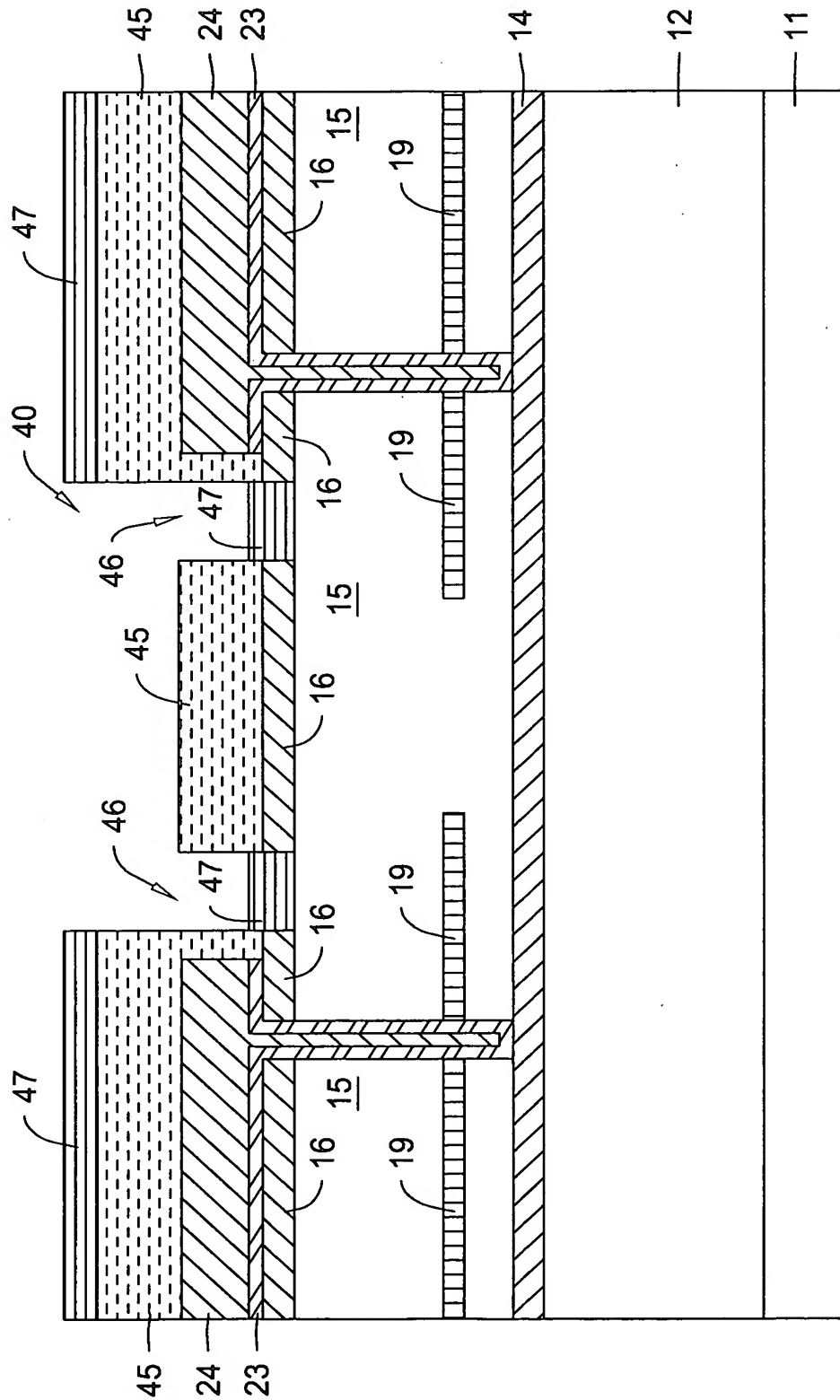


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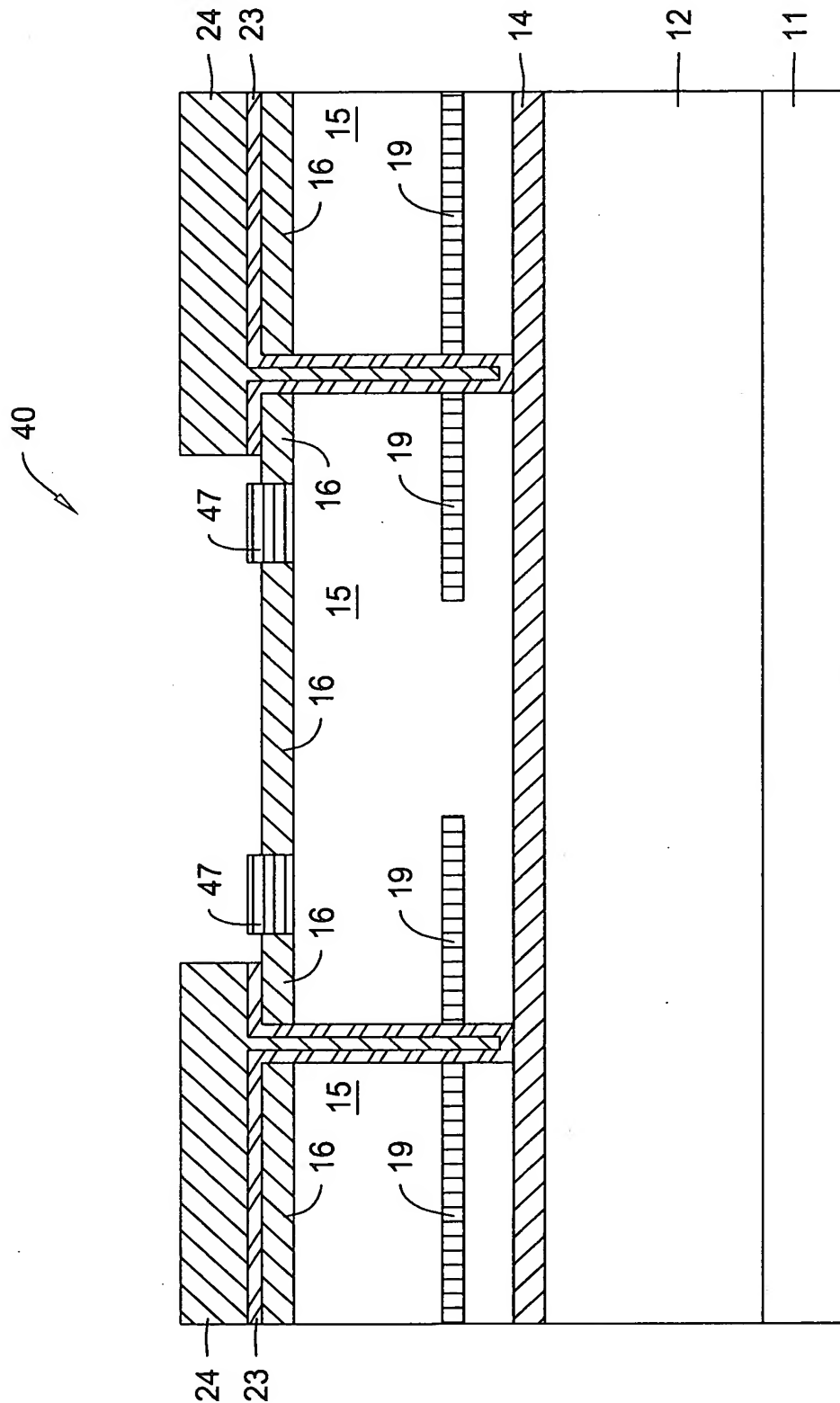


Figure 49

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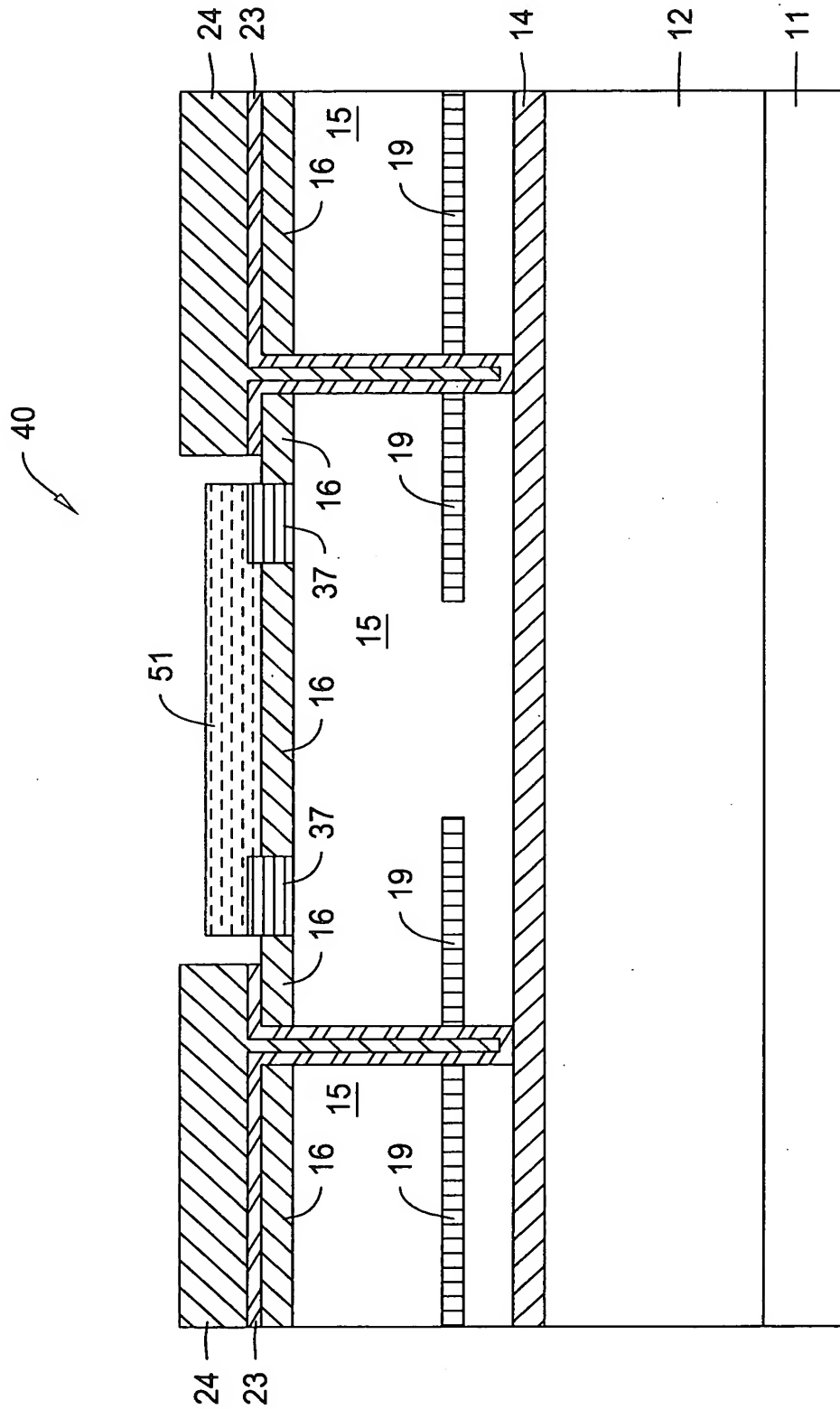


Figure 50

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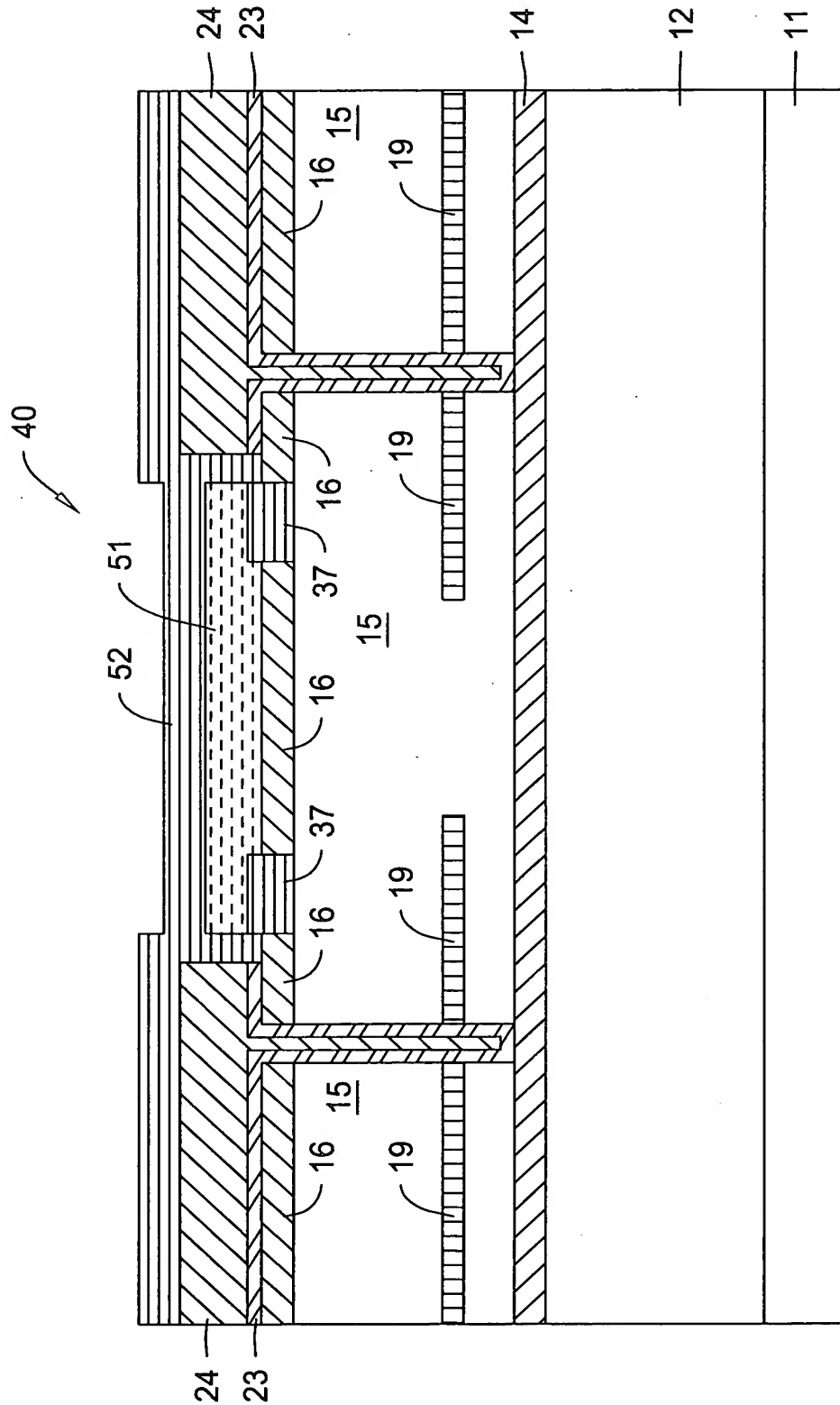


Figure 51



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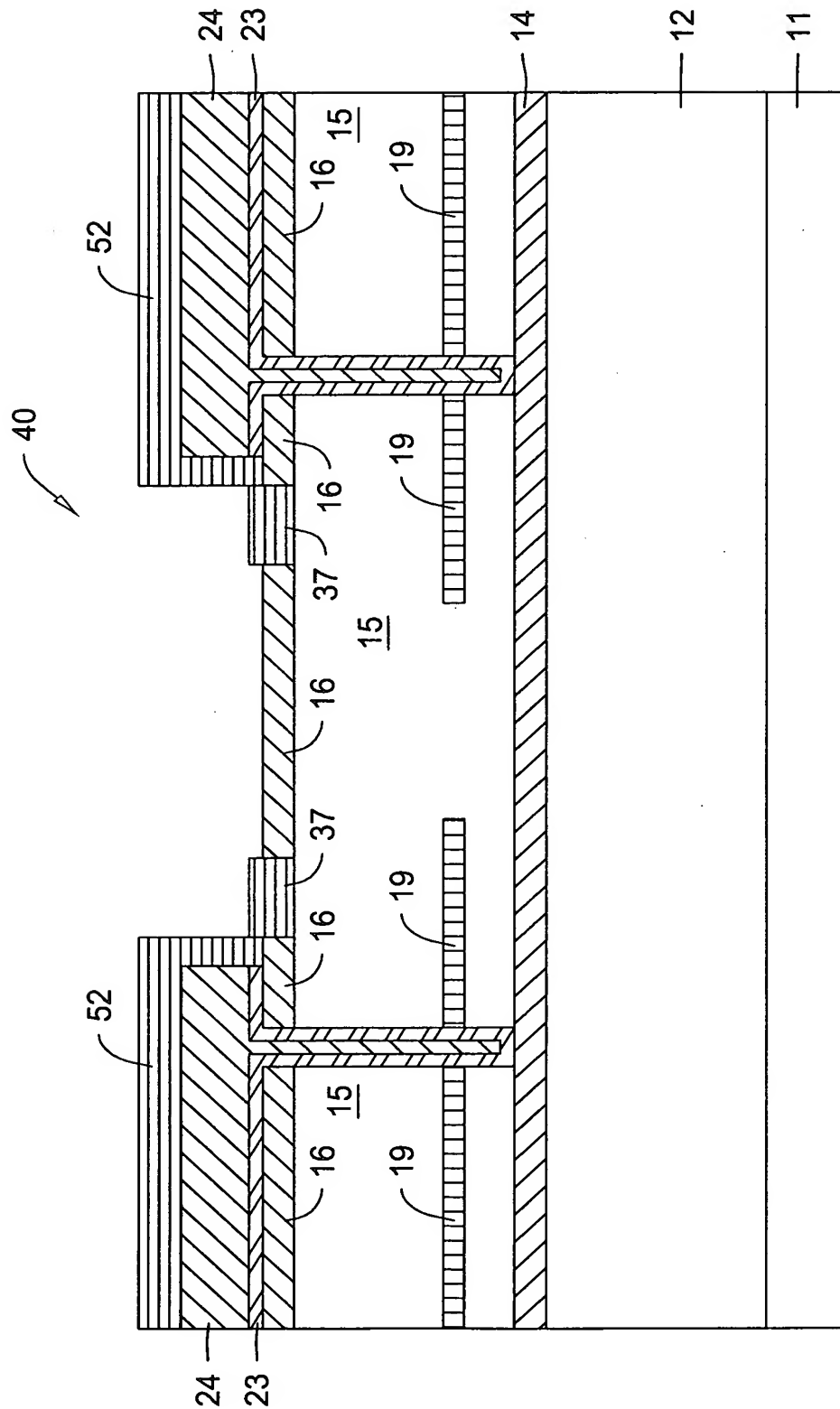


Figure 52

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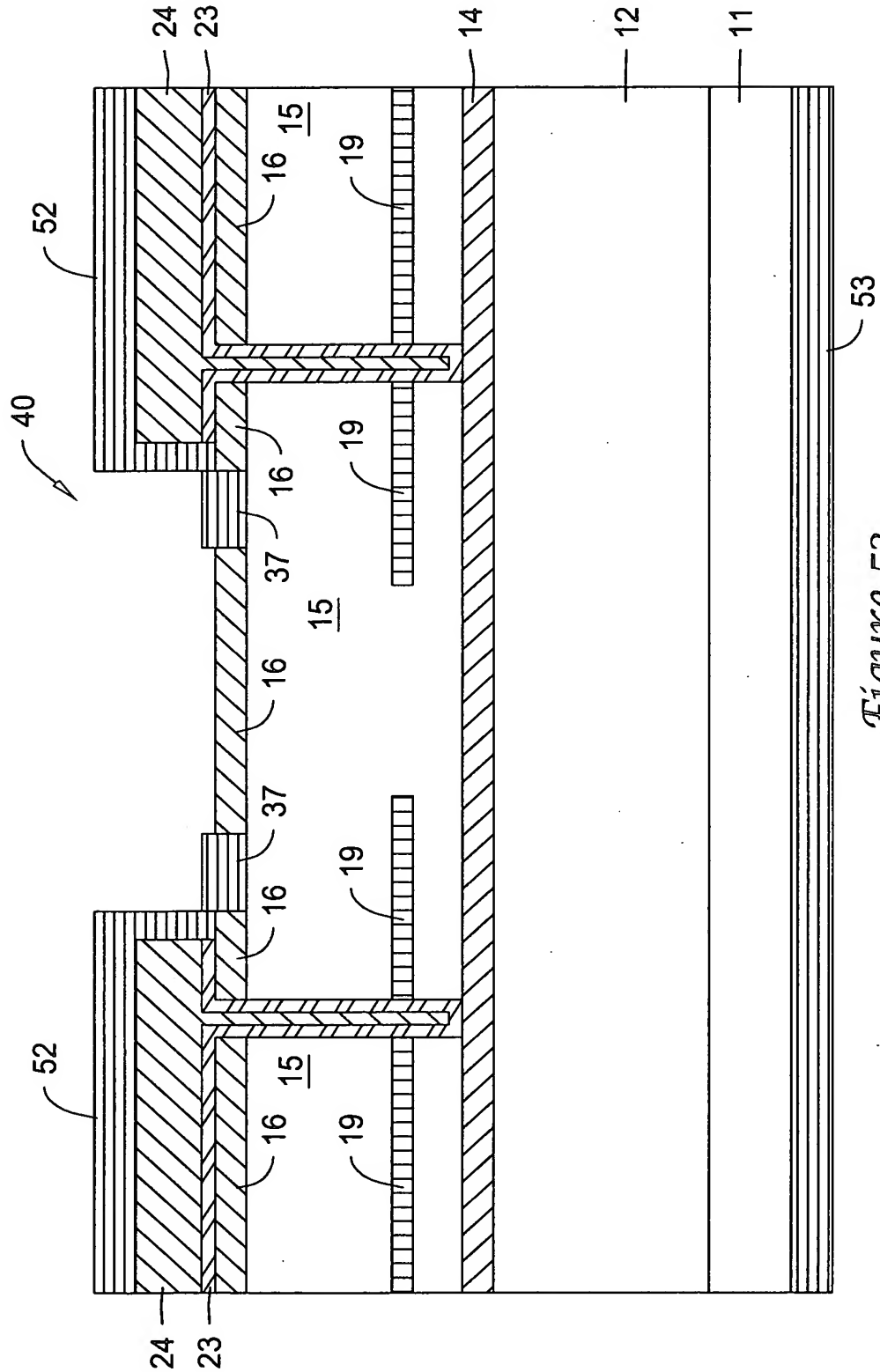


Figure 53

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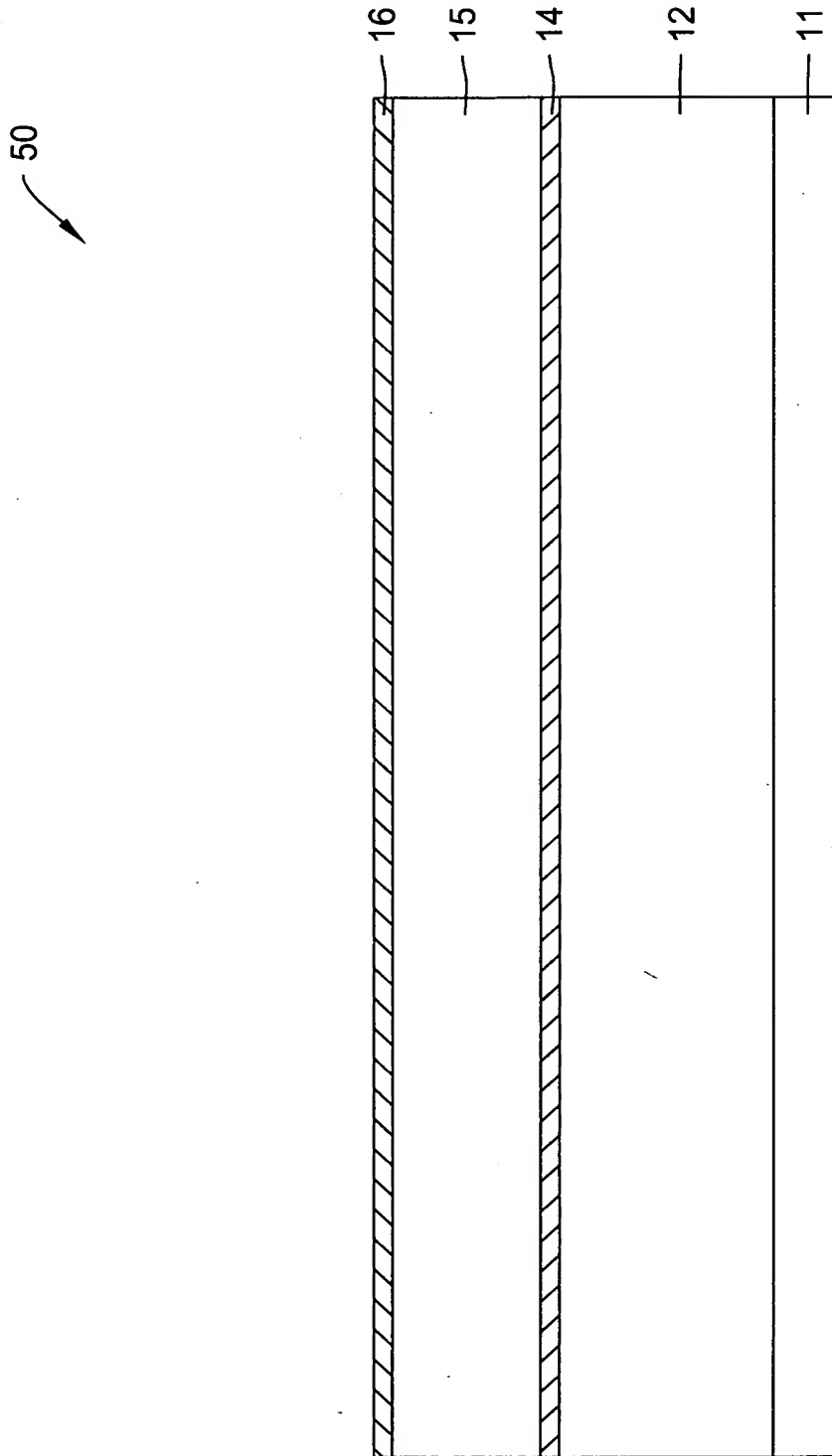


Figure 54

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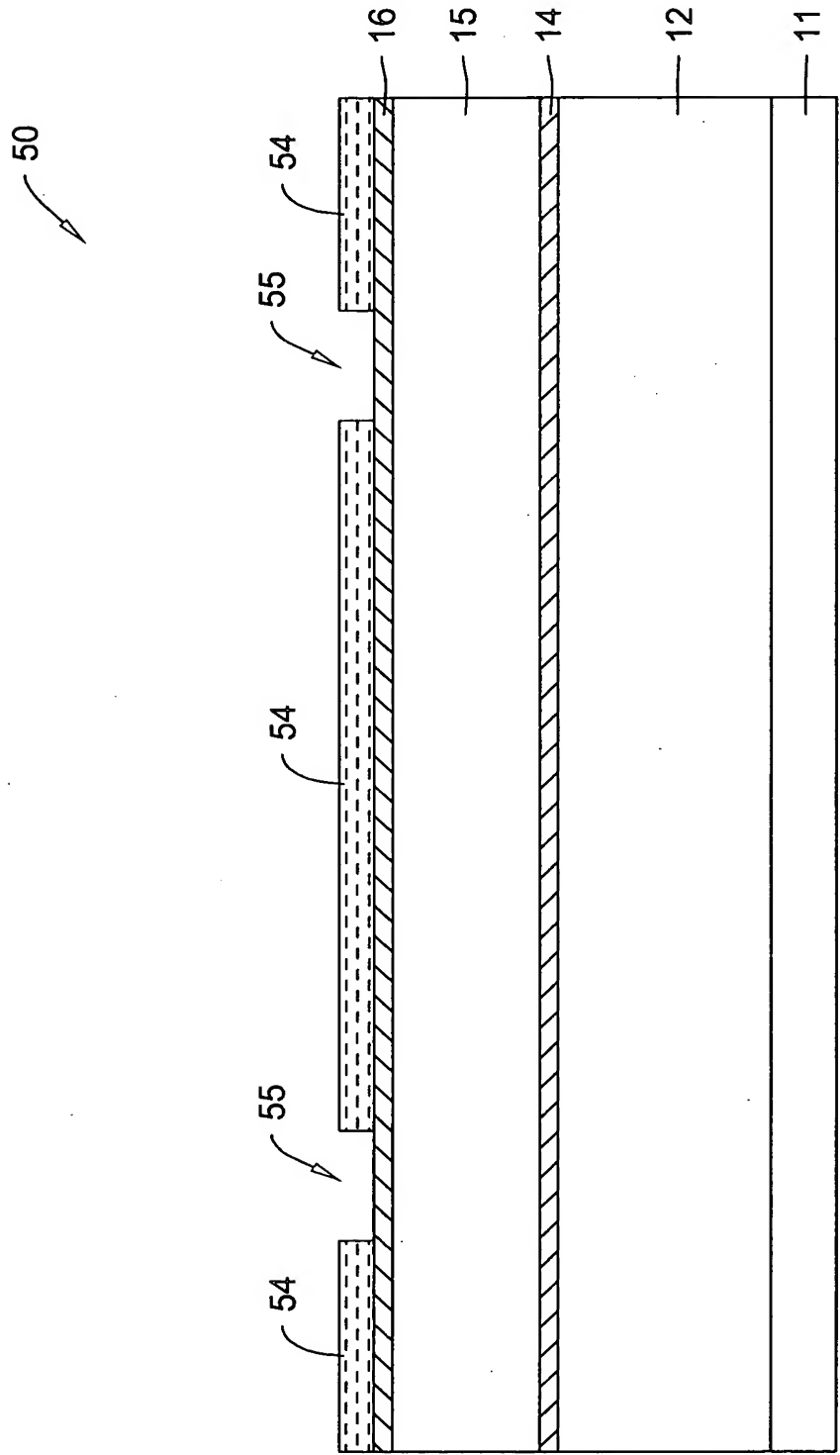


Figure 55



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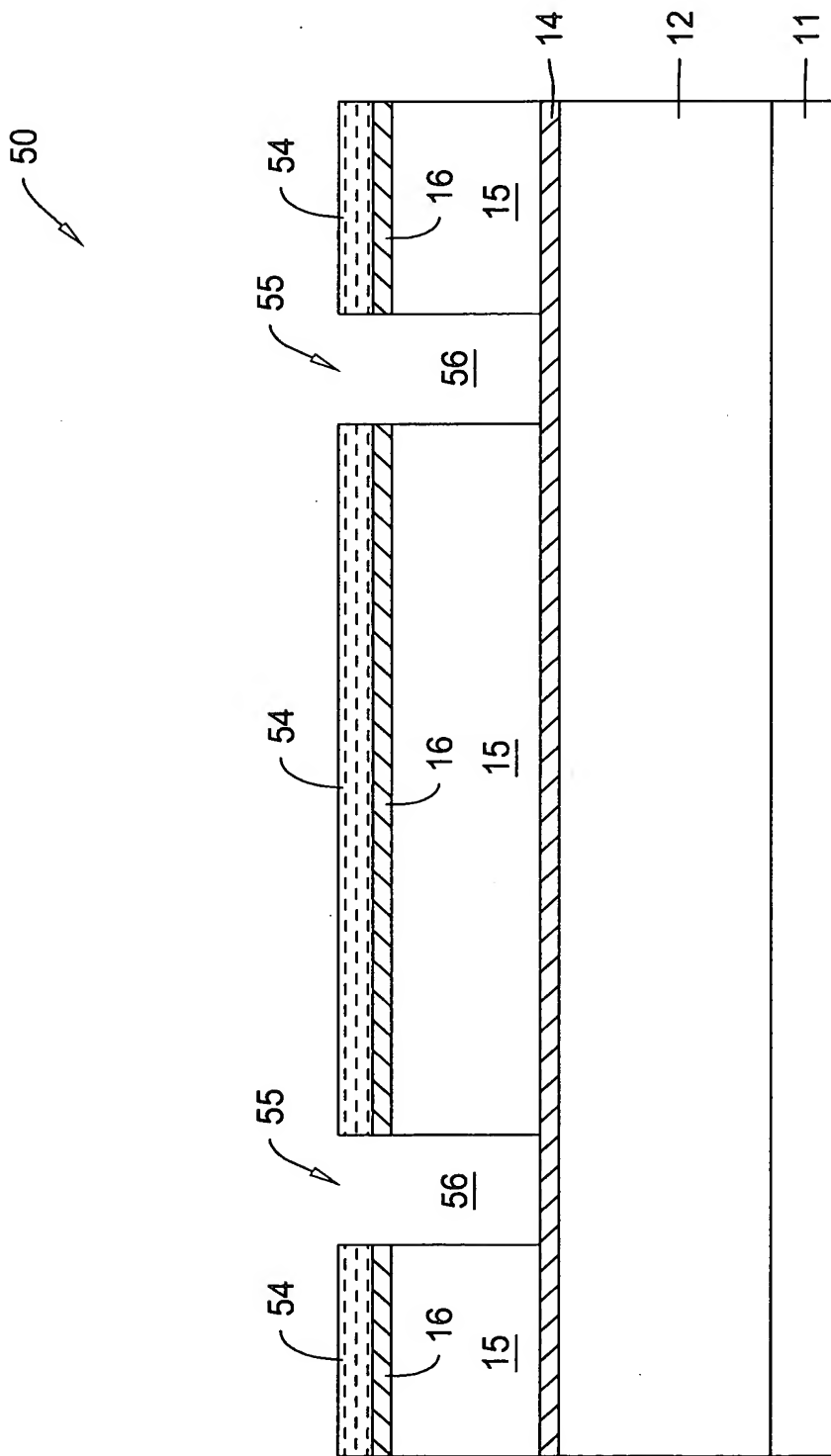


Figure 57

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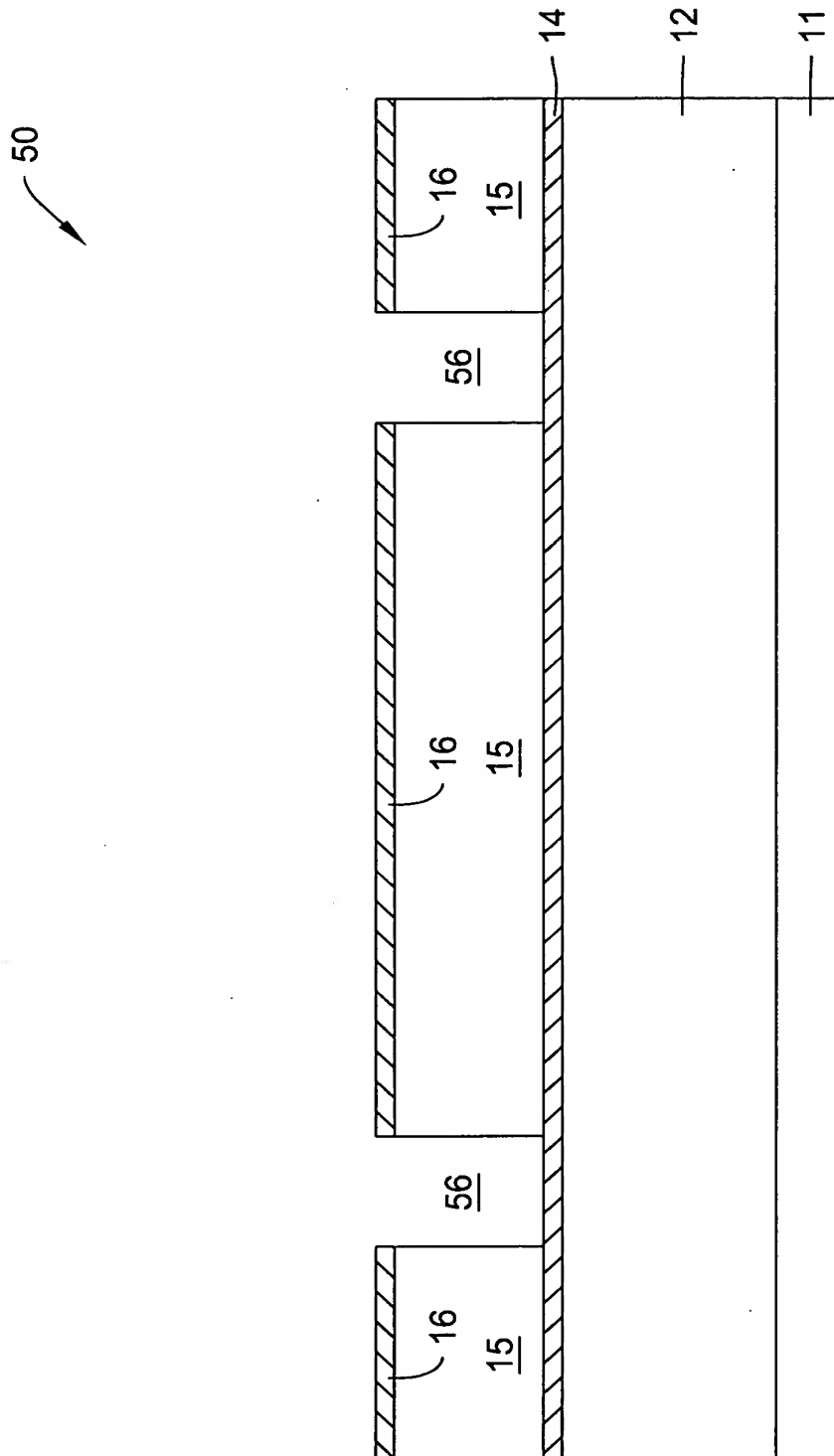


Figure 58

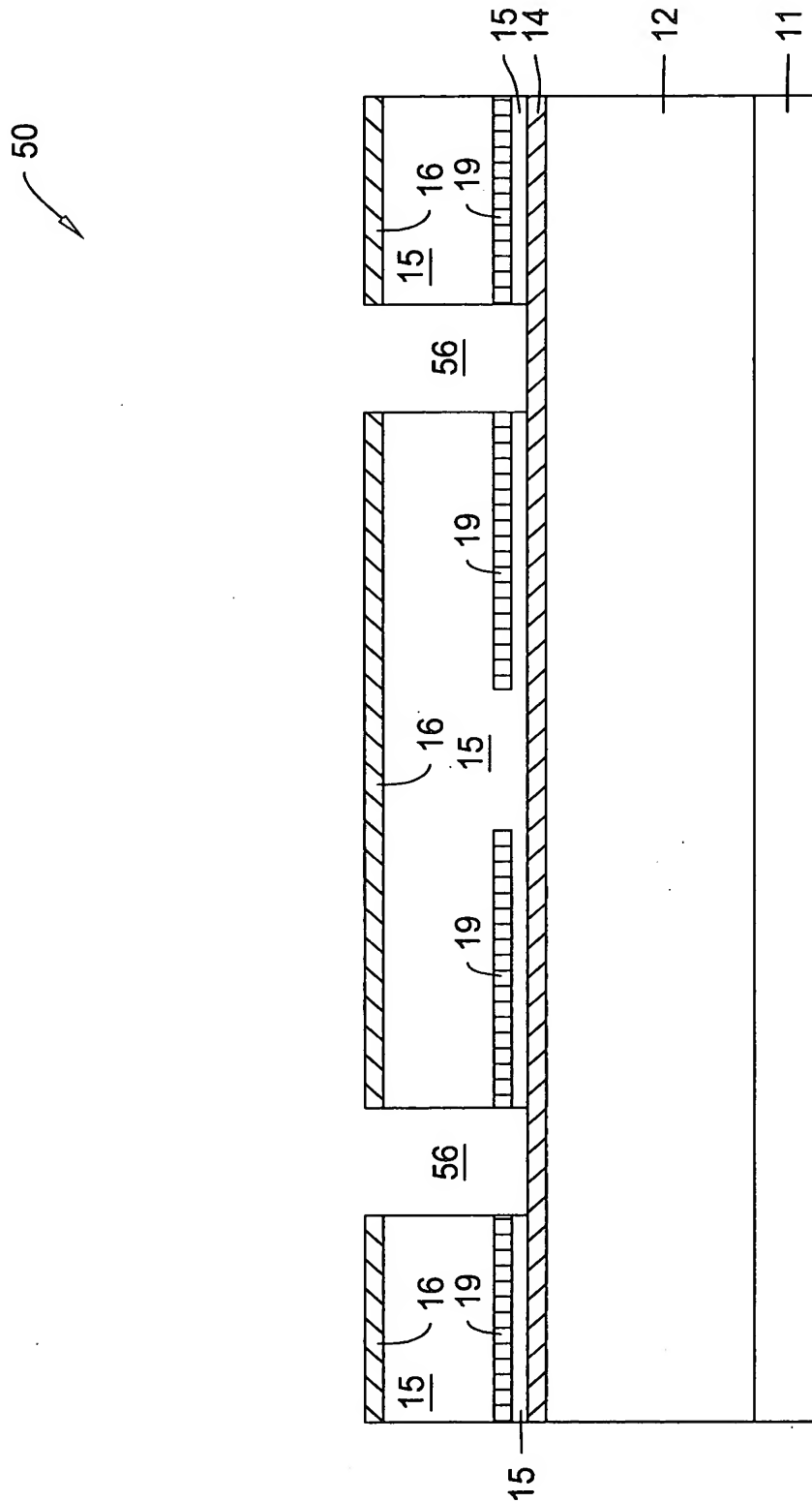


Figure 59



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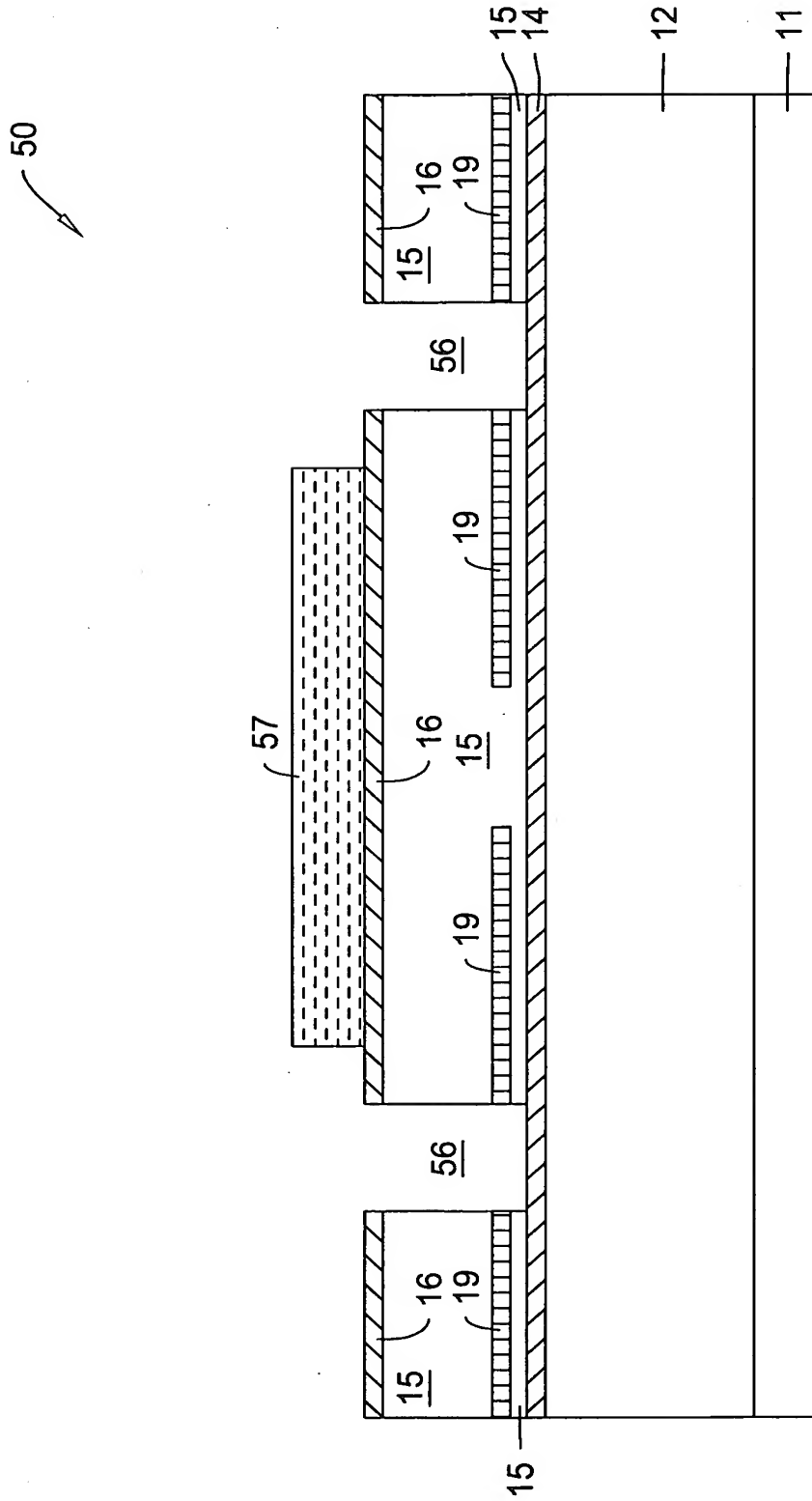


Figure 60

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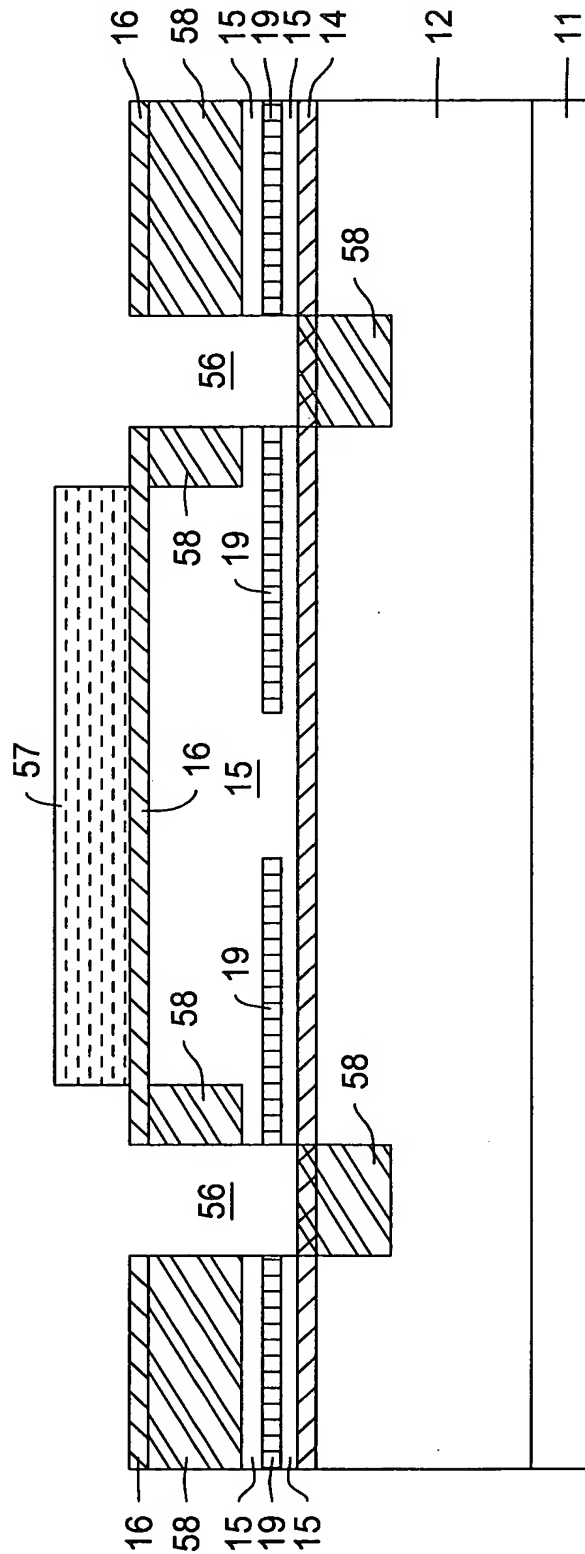


Figure 6i

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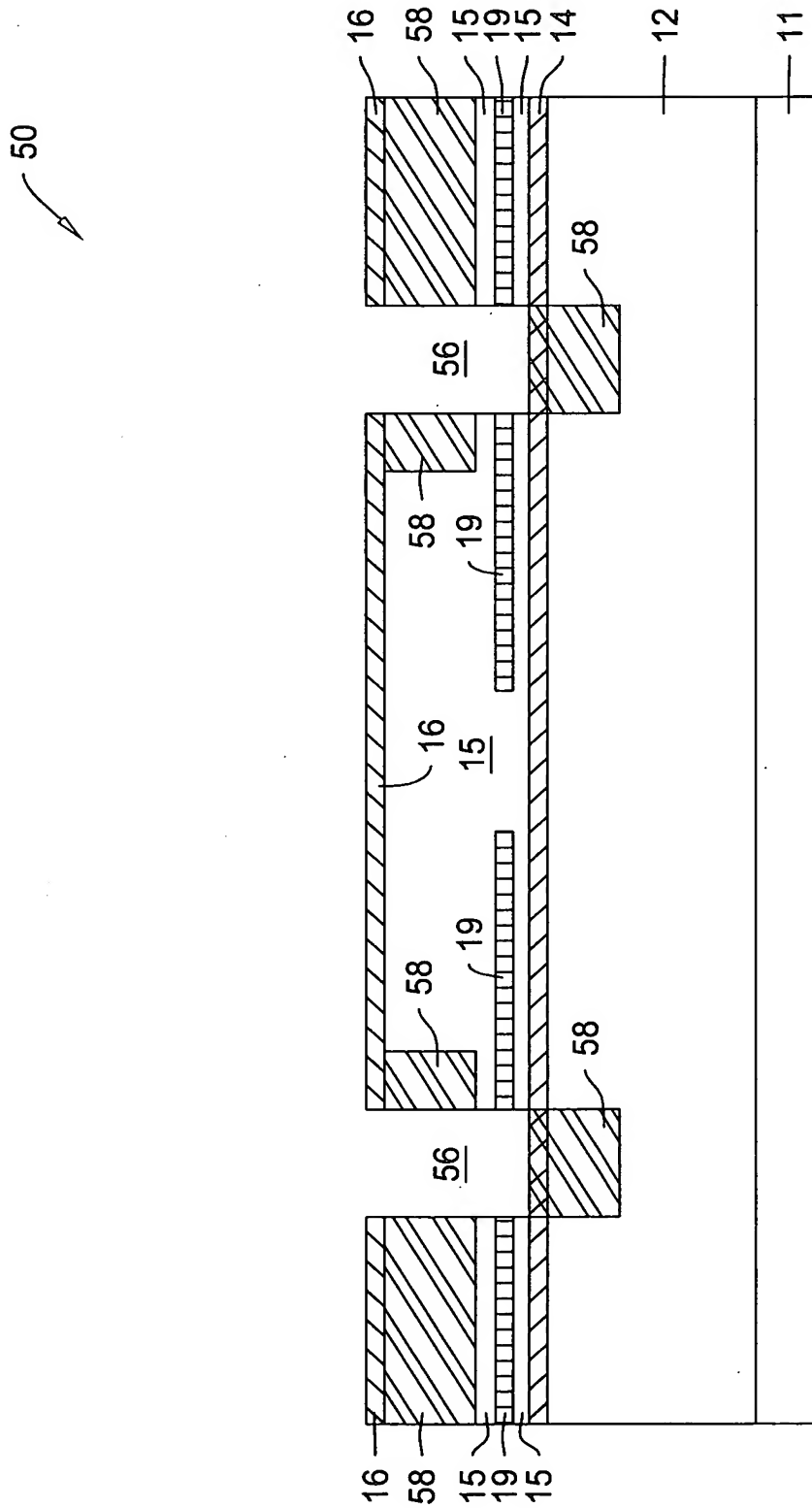


Figure 62

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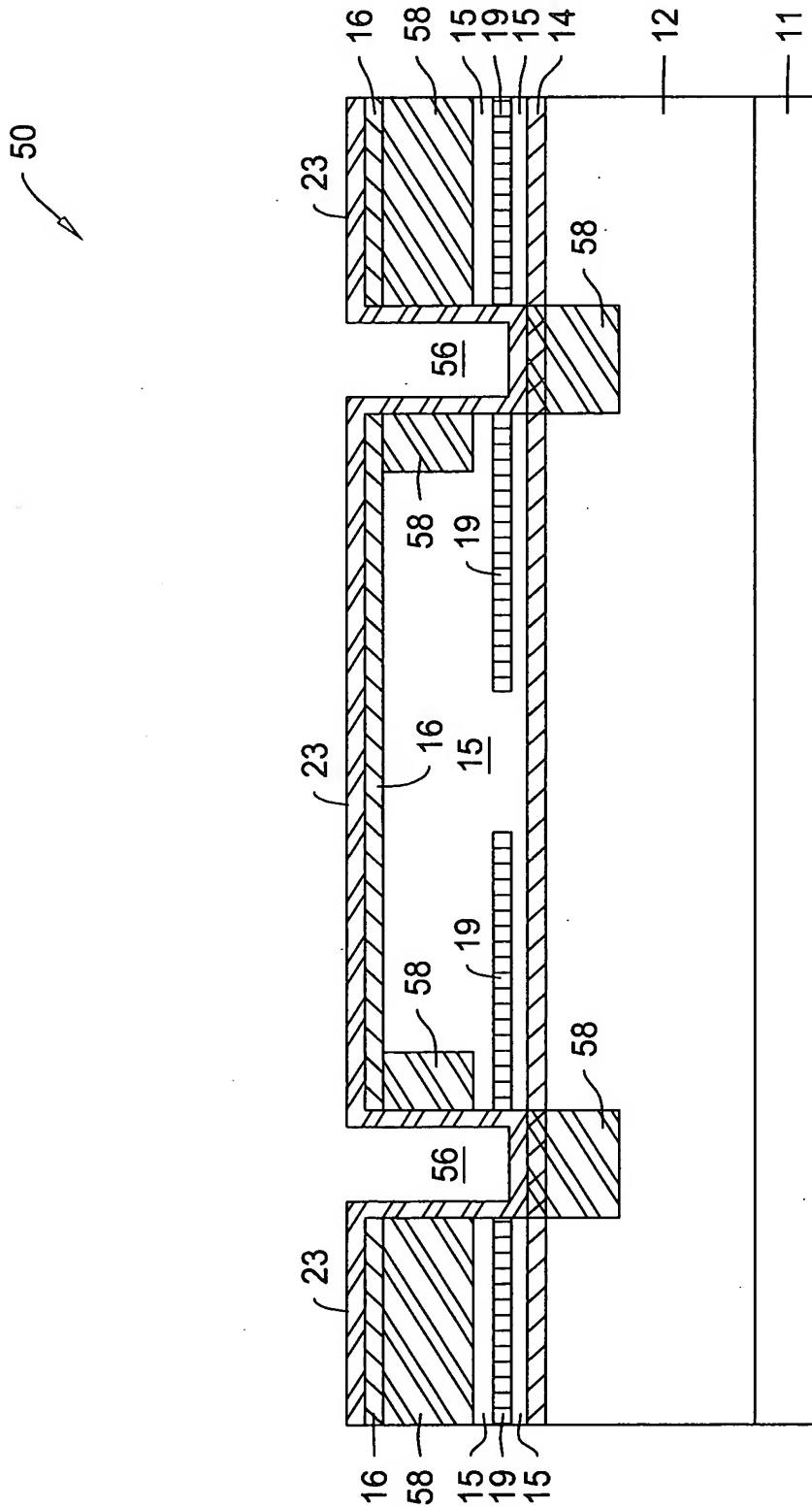


Figure 63

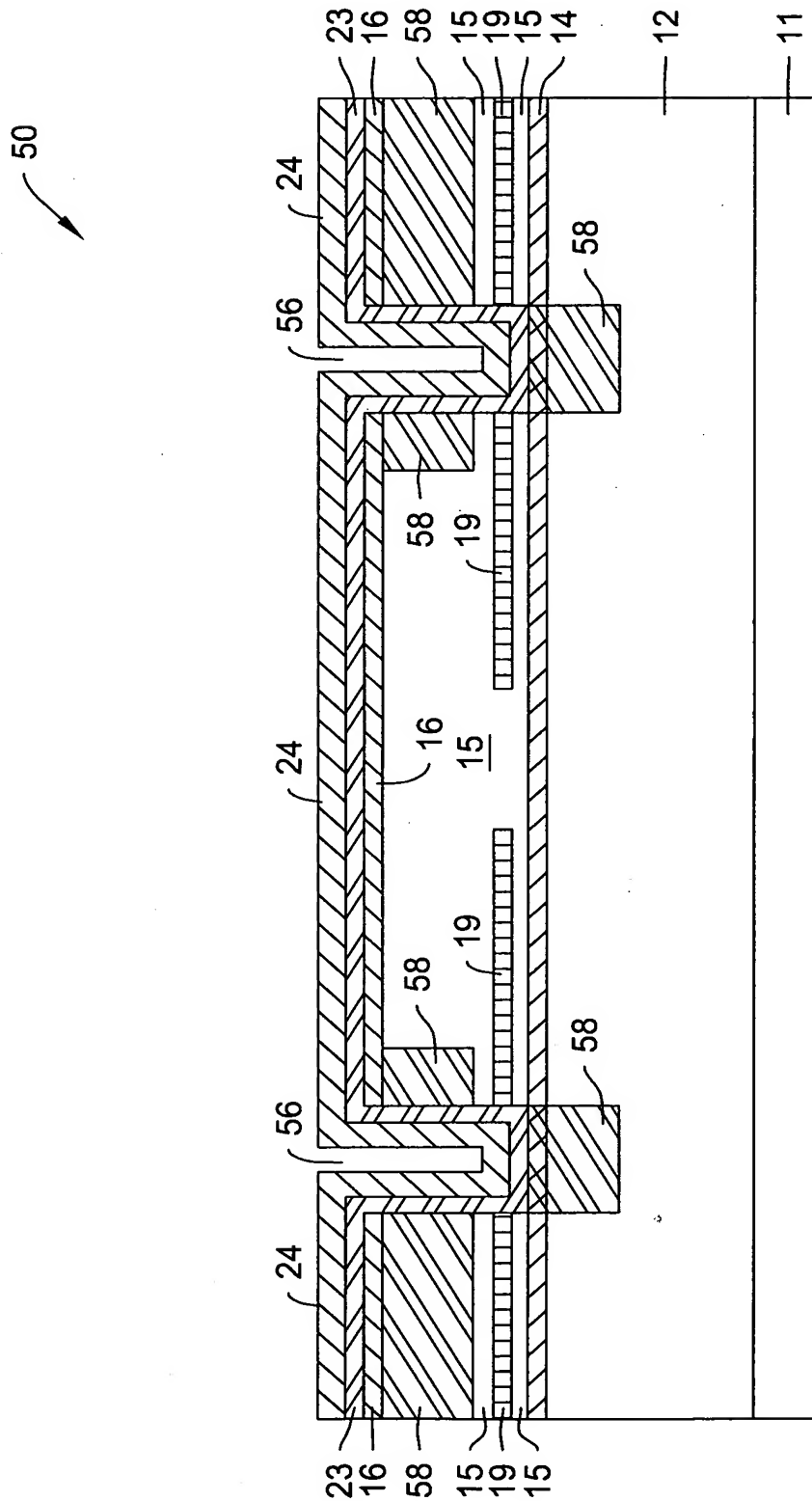


Figure 64



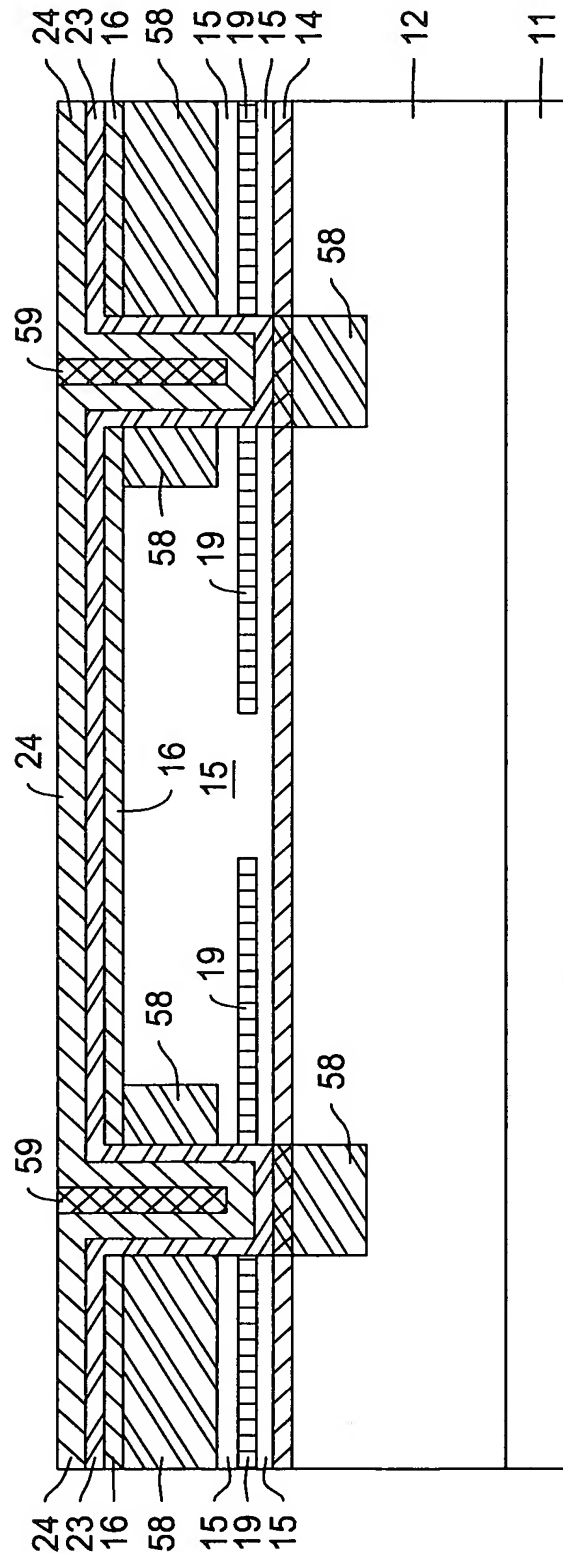


Figure 66

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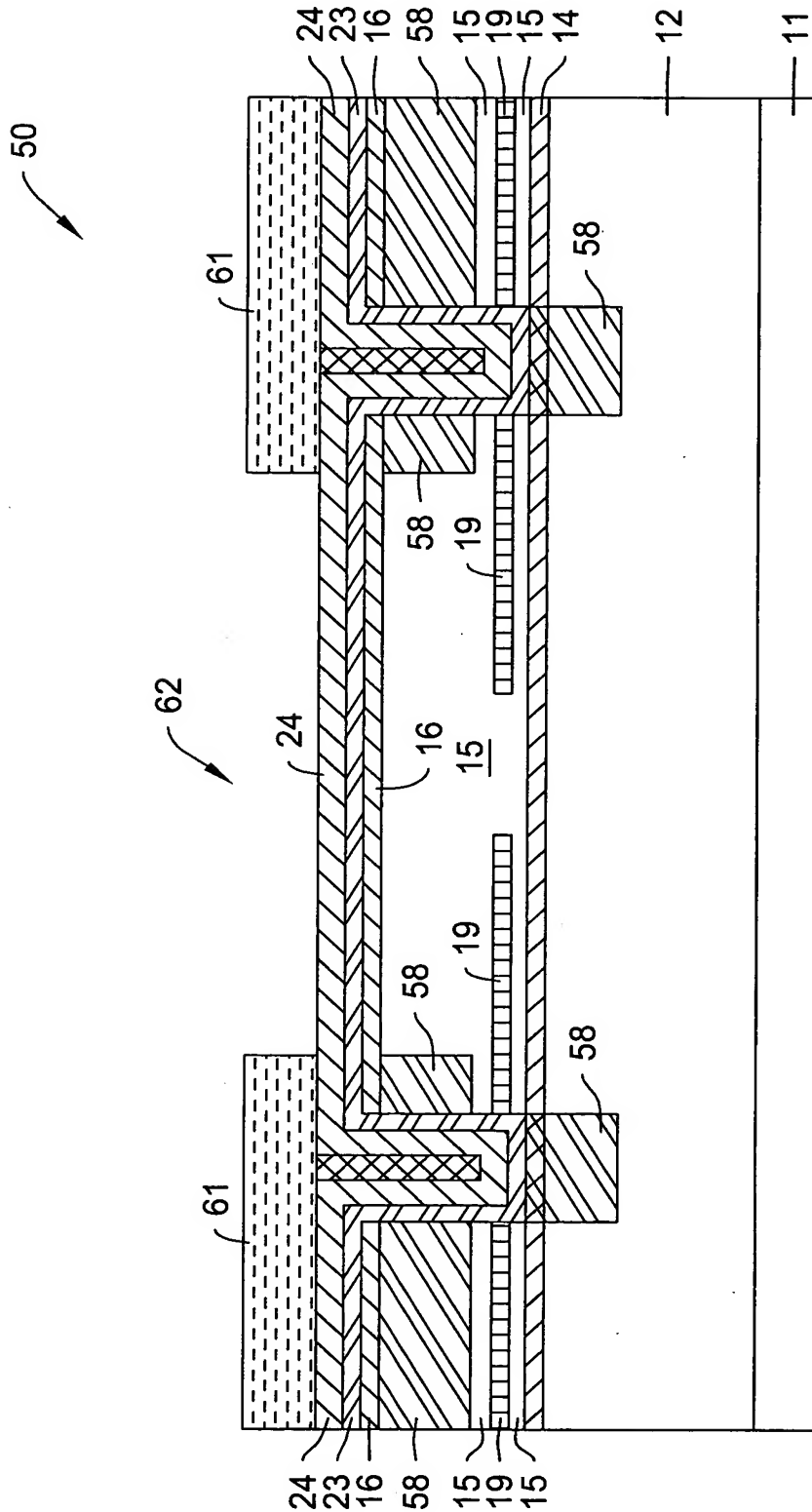


Figure 67



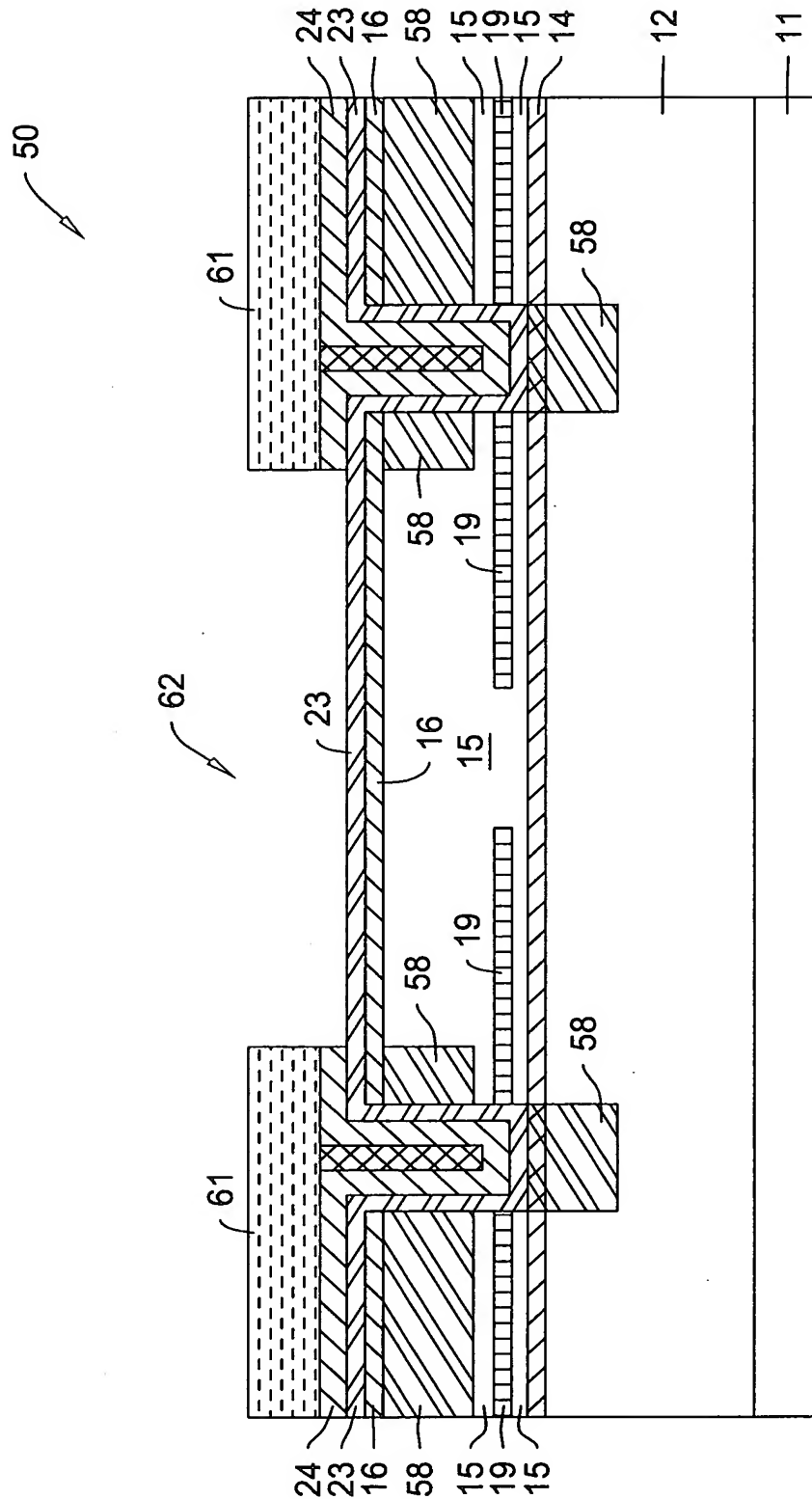


Figure 68

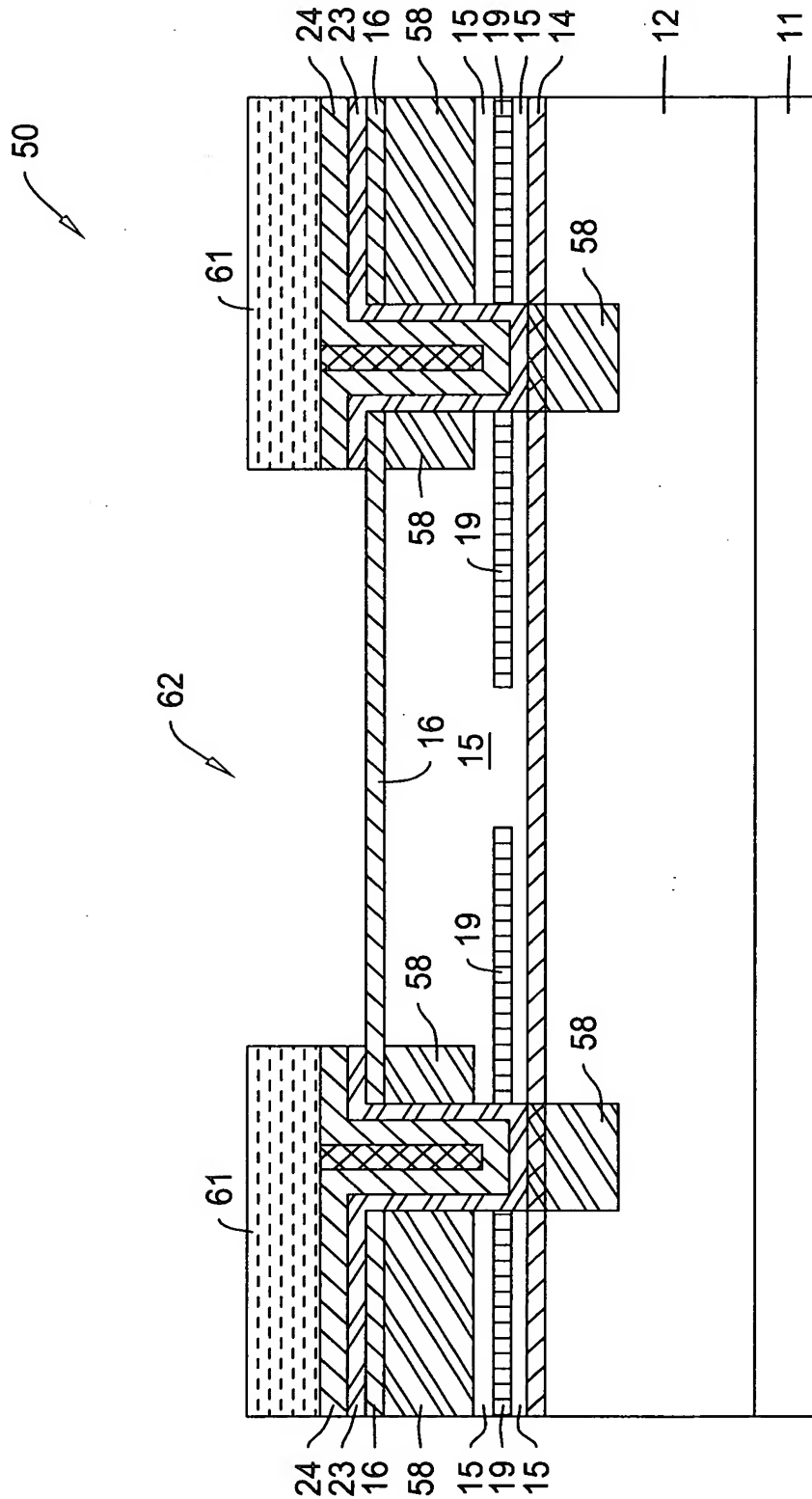


Figure 69

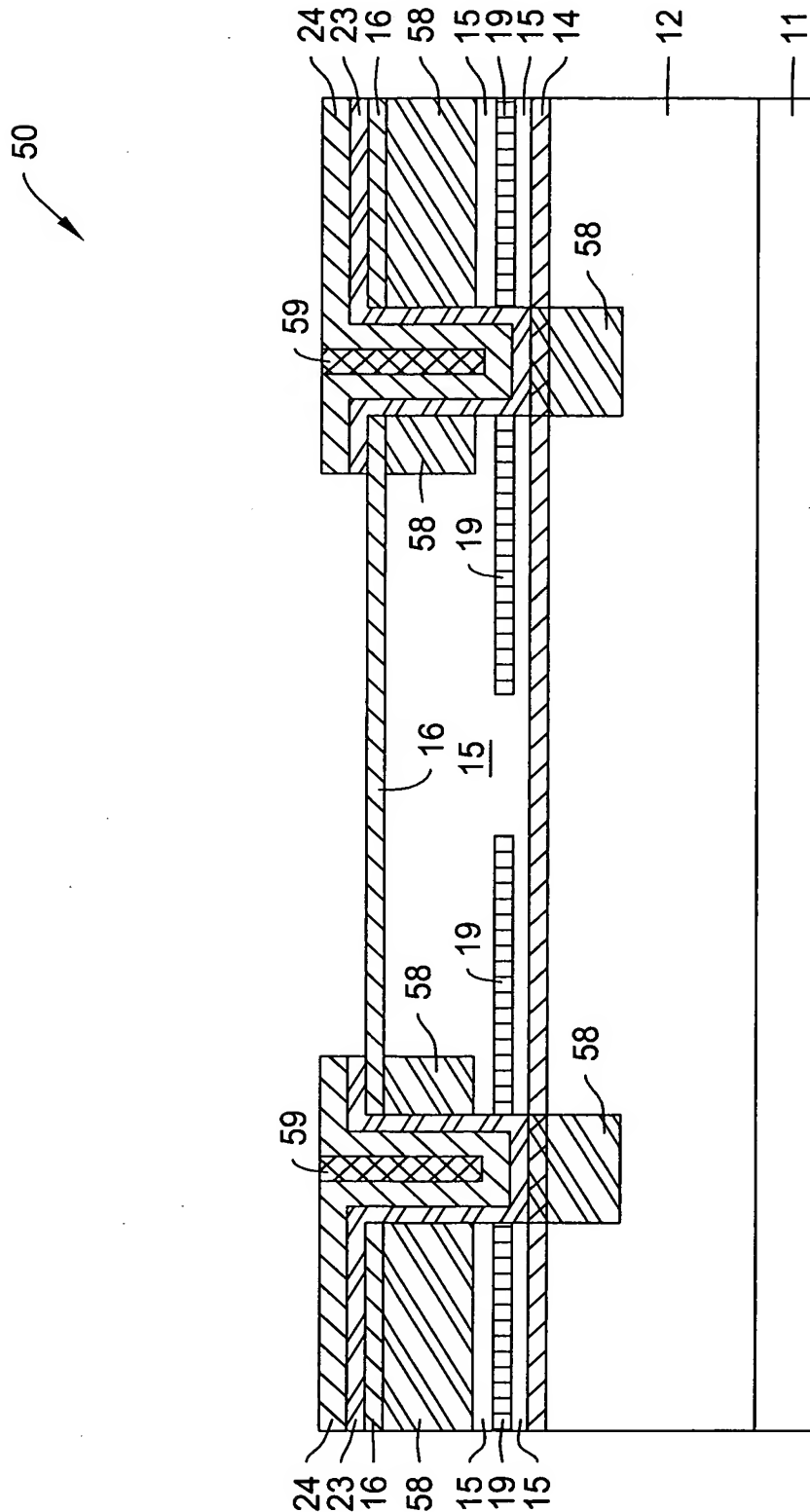


Figure 70



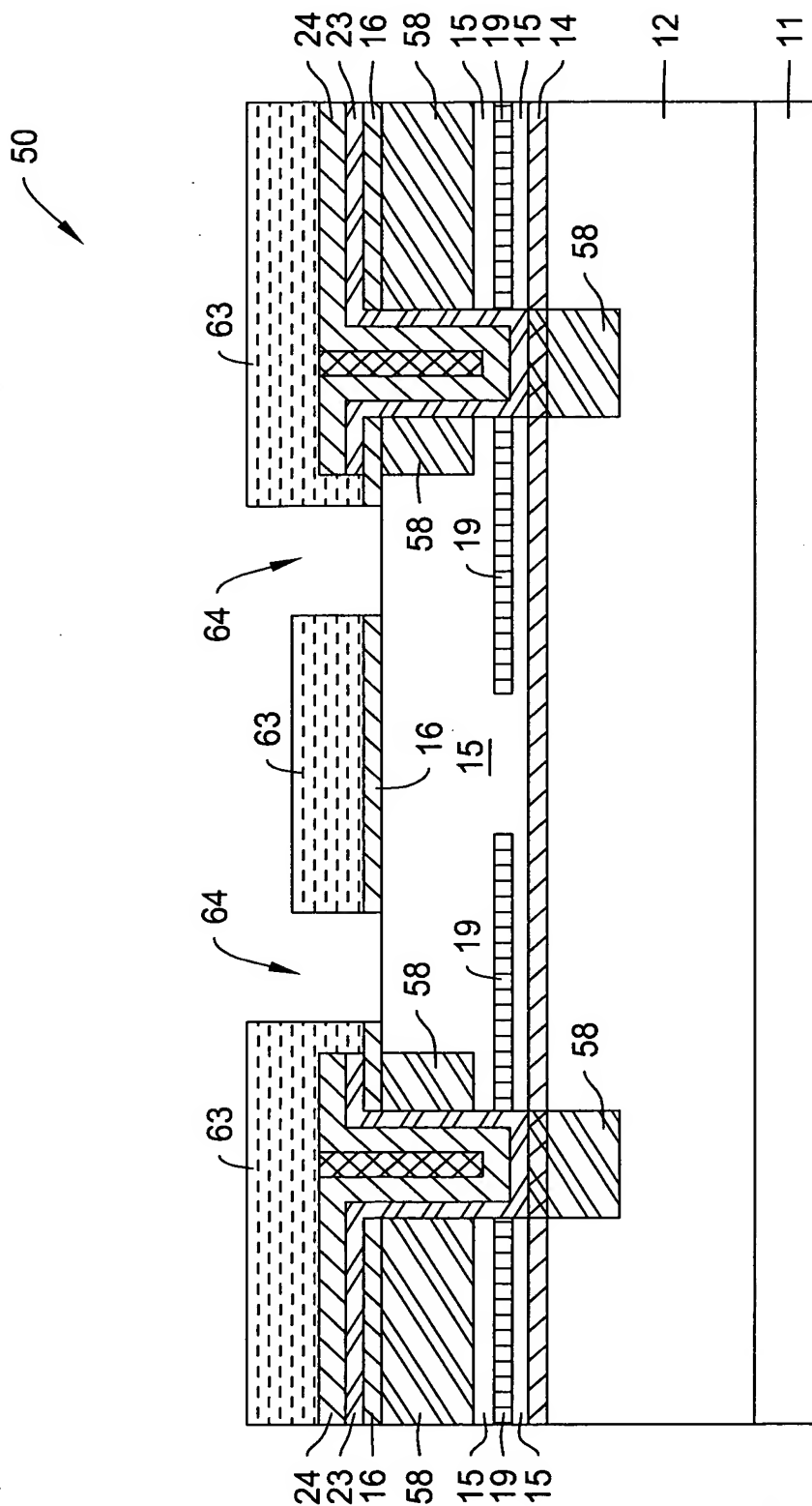


Figure 72

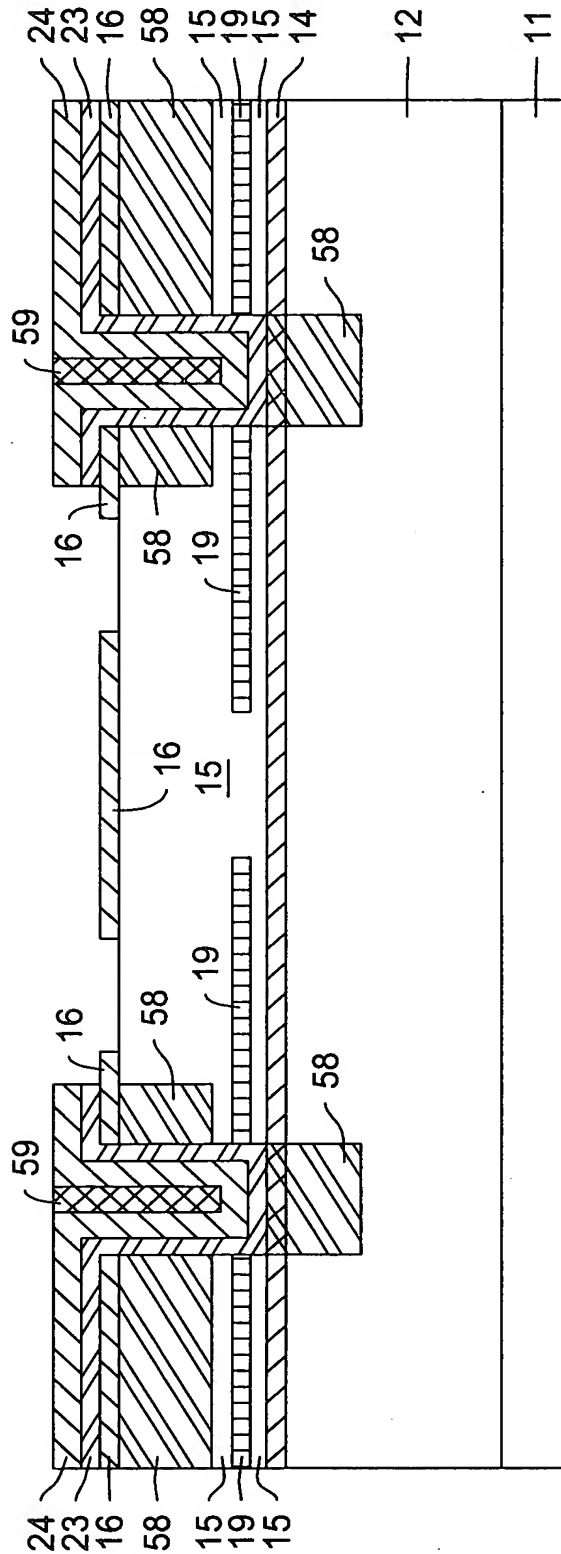


Figure 73

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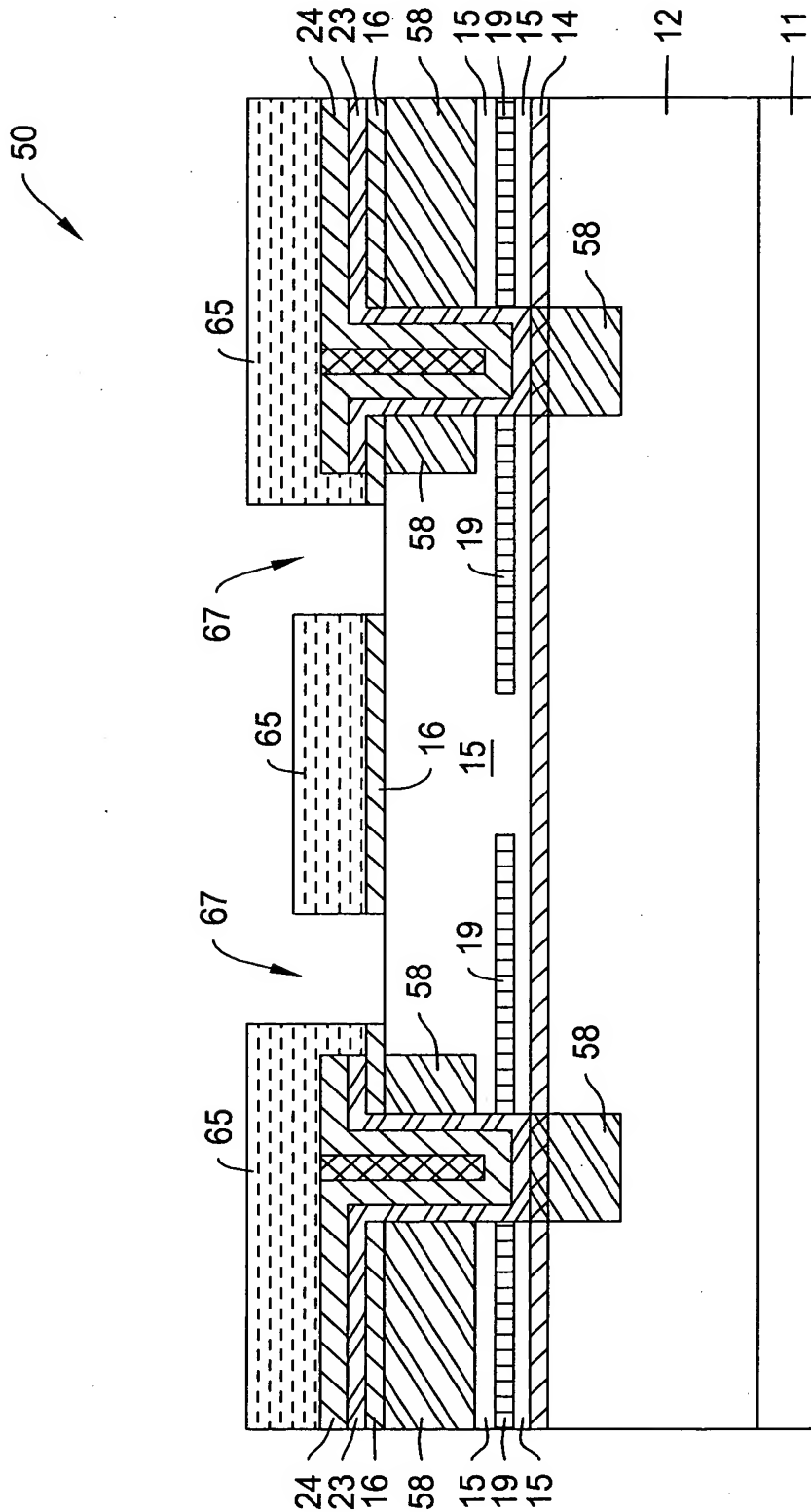


Figure 74

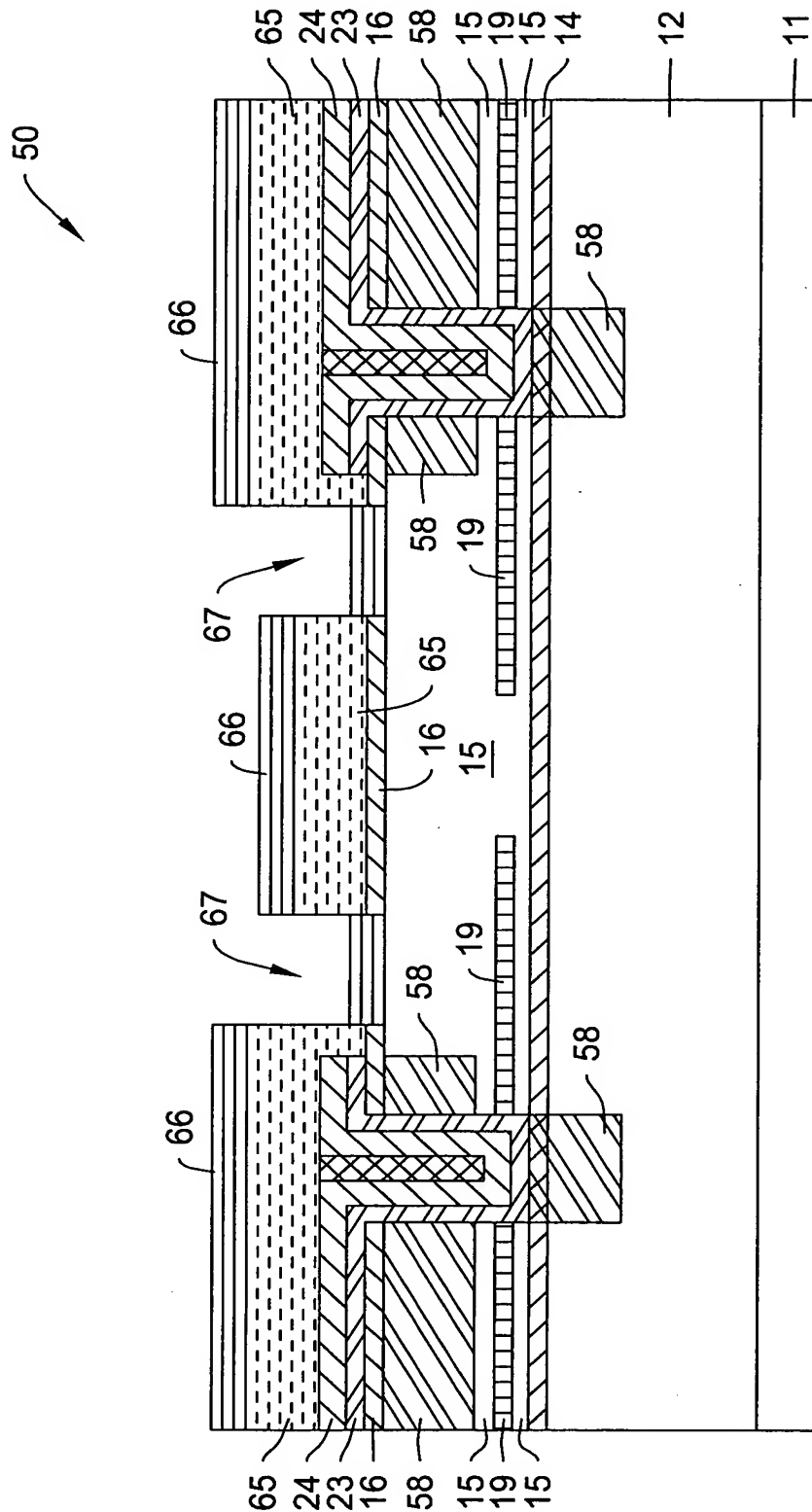


Figure 75



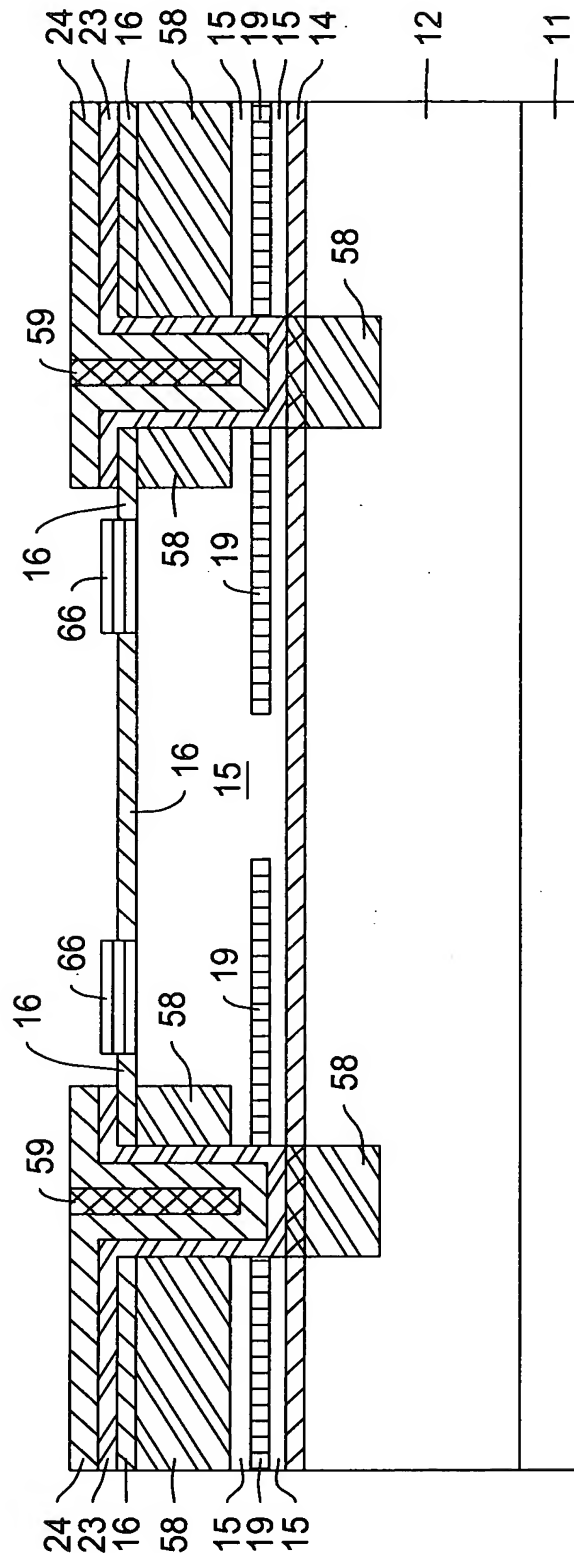


Figure 76

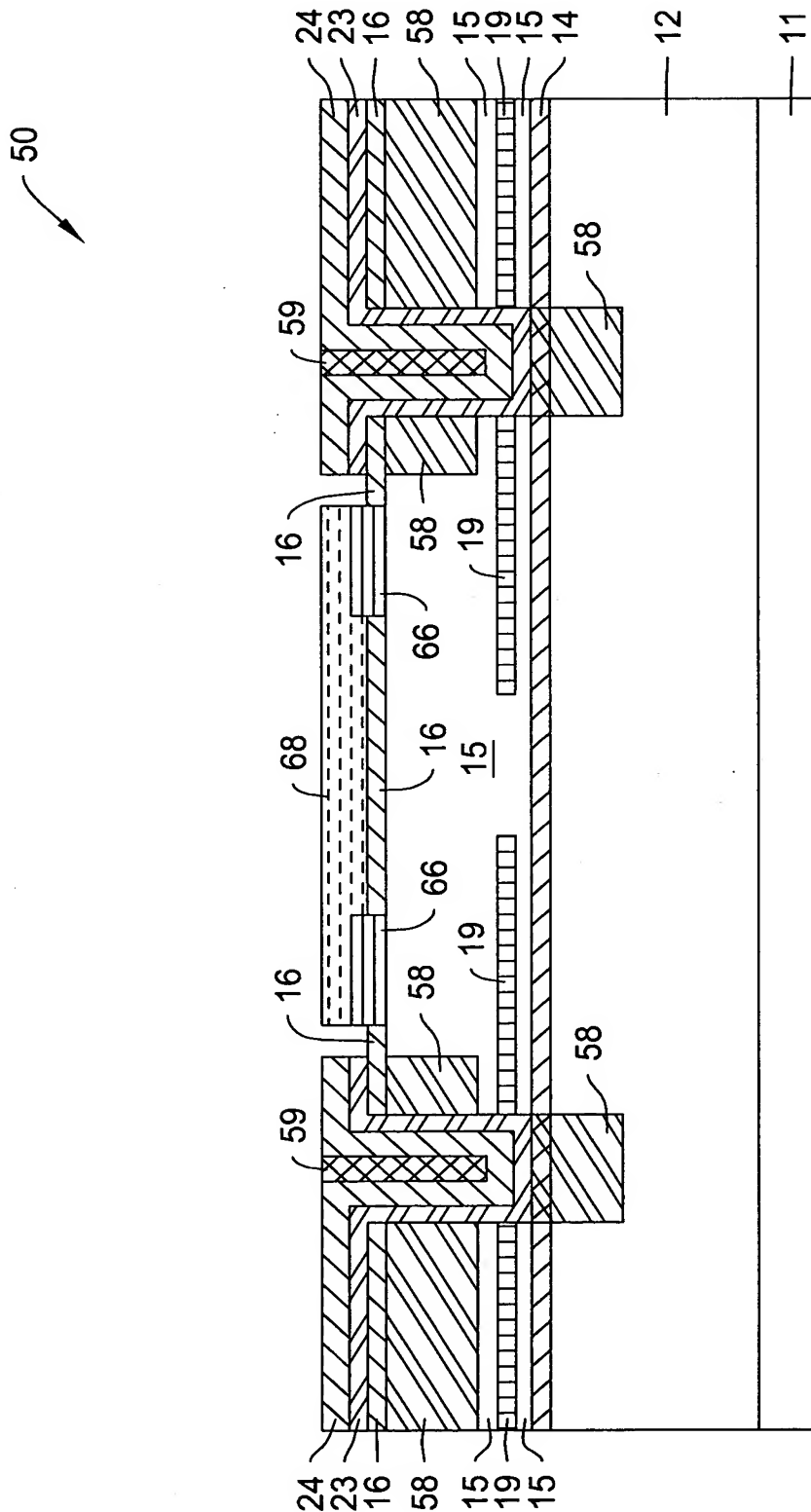


Figure 77

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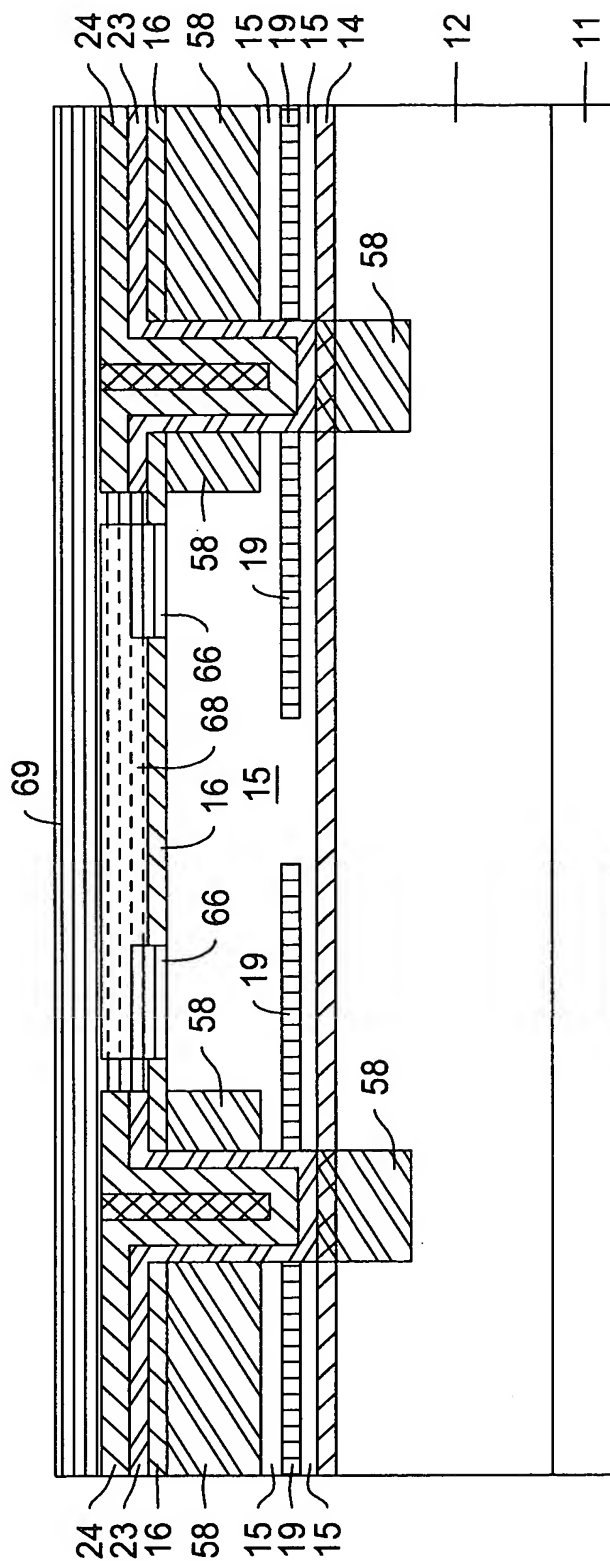


Figure 78





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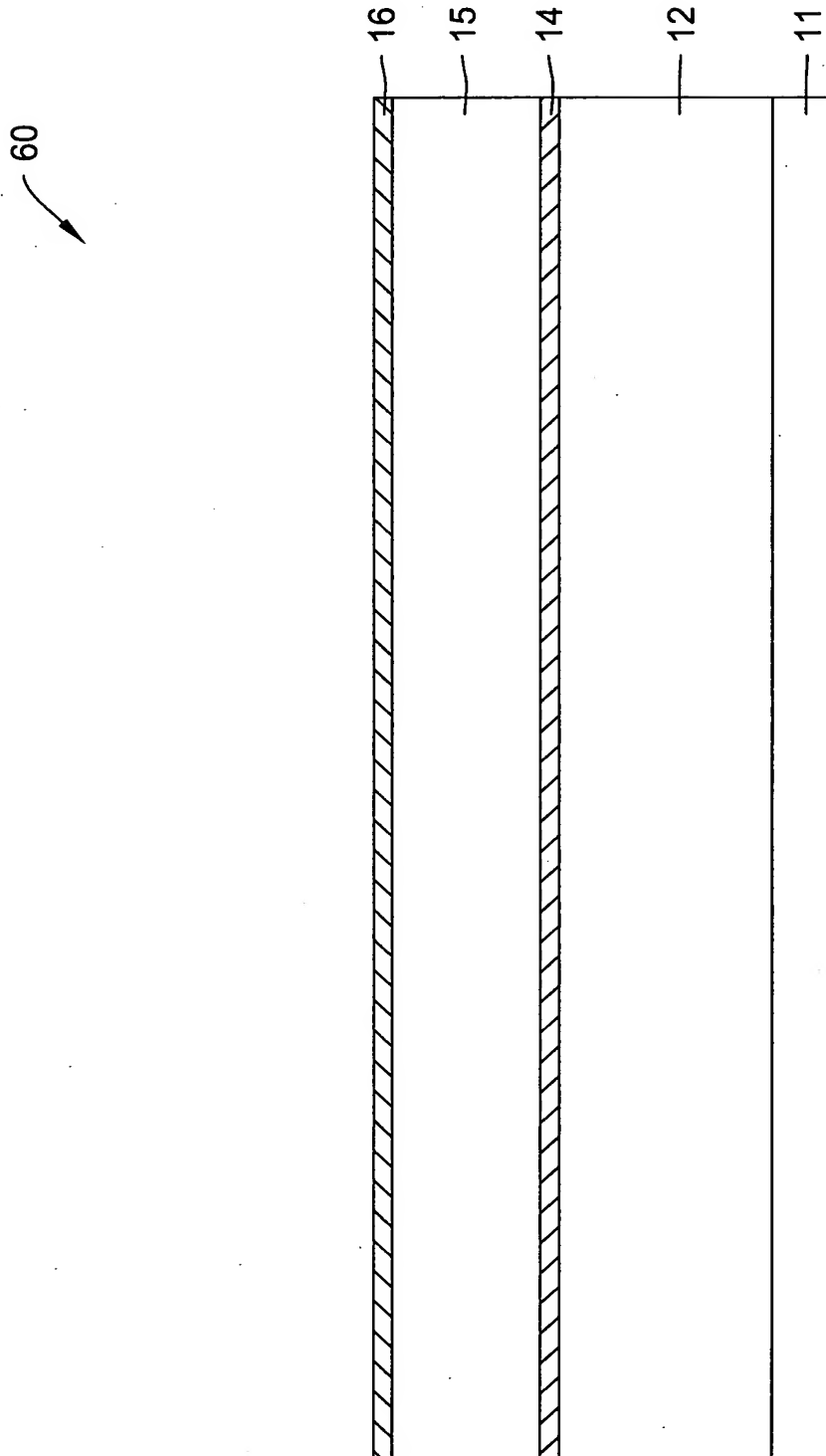


Figure 81

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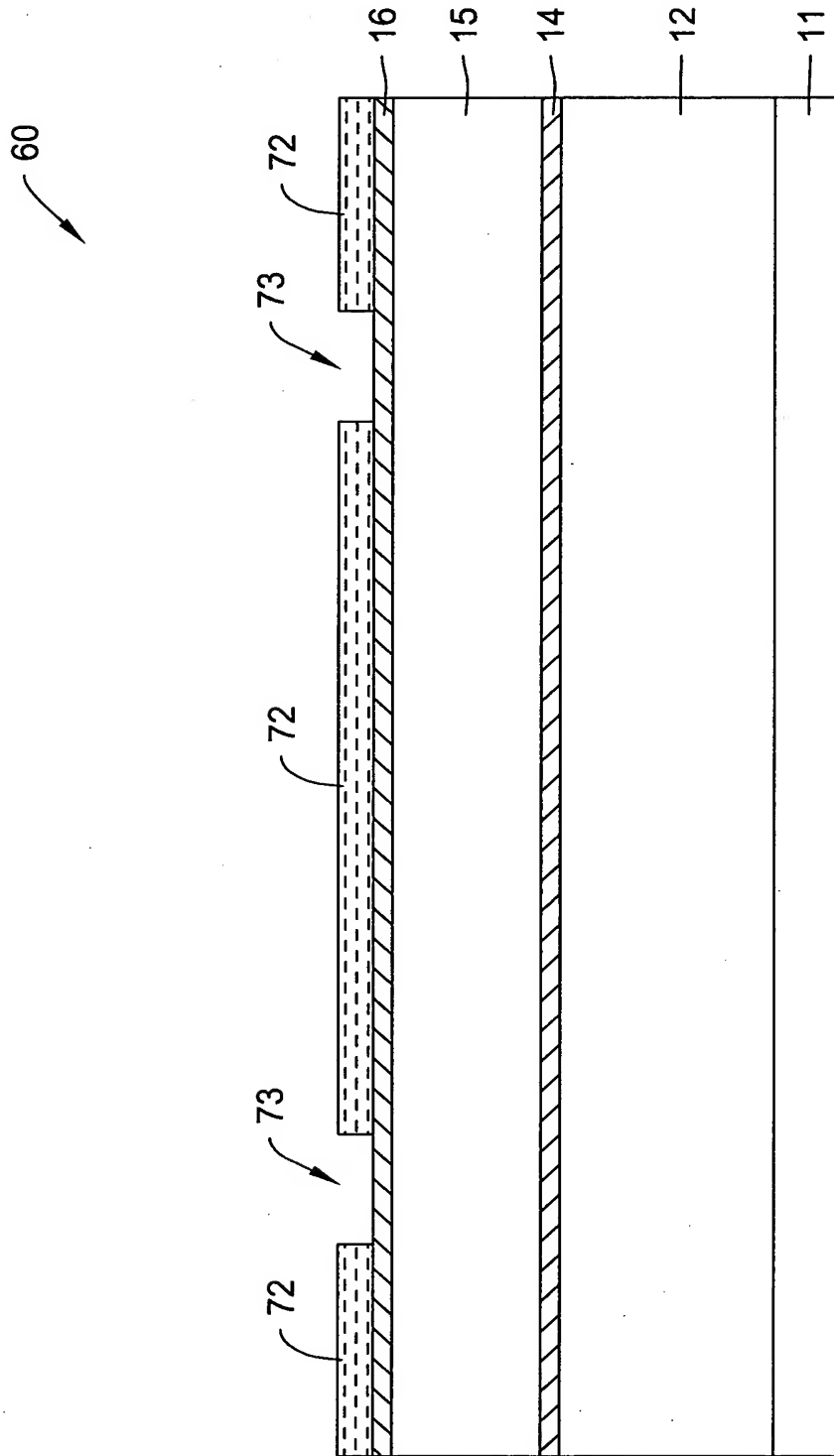


Figure 82

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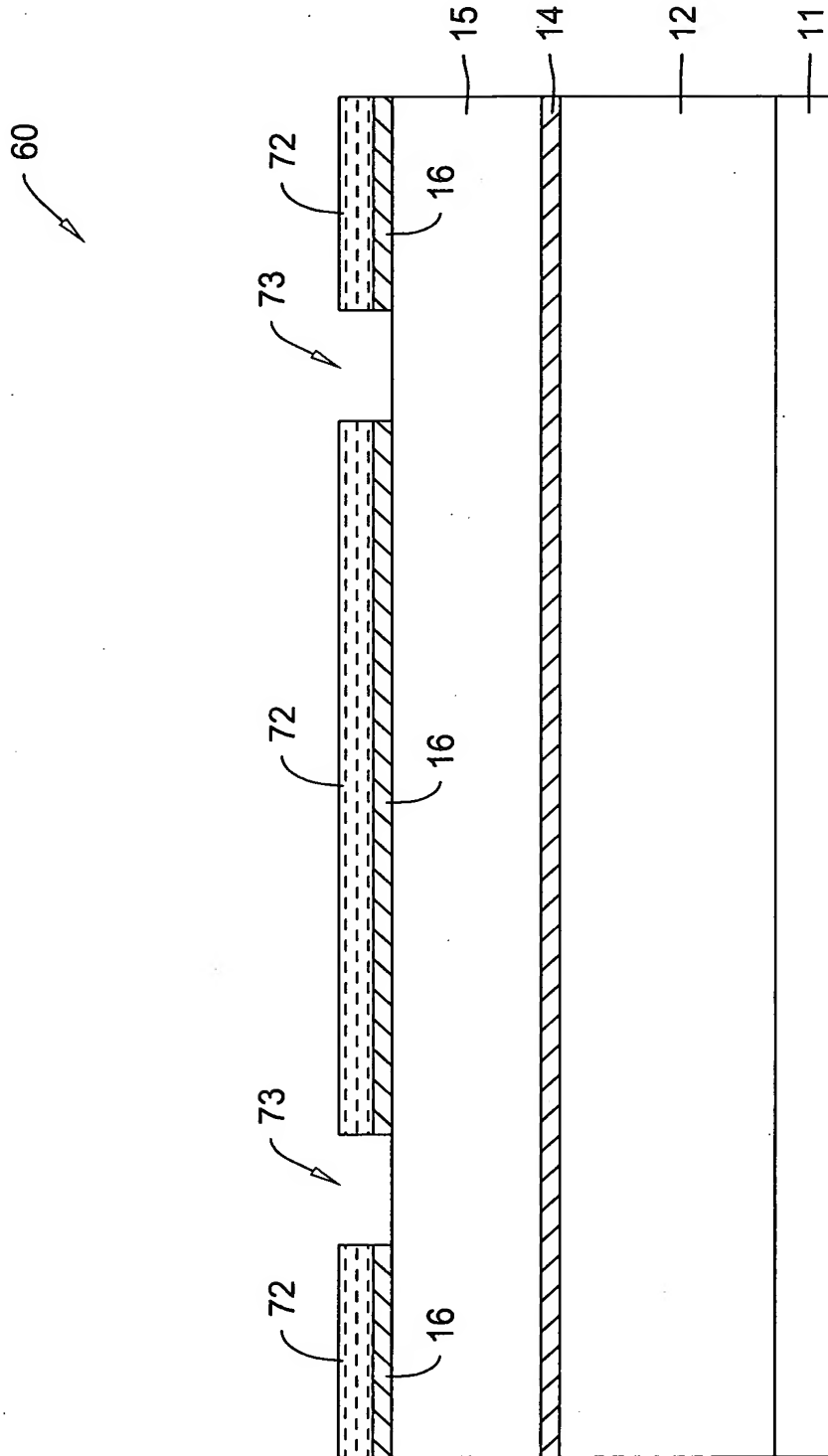


Figure 83



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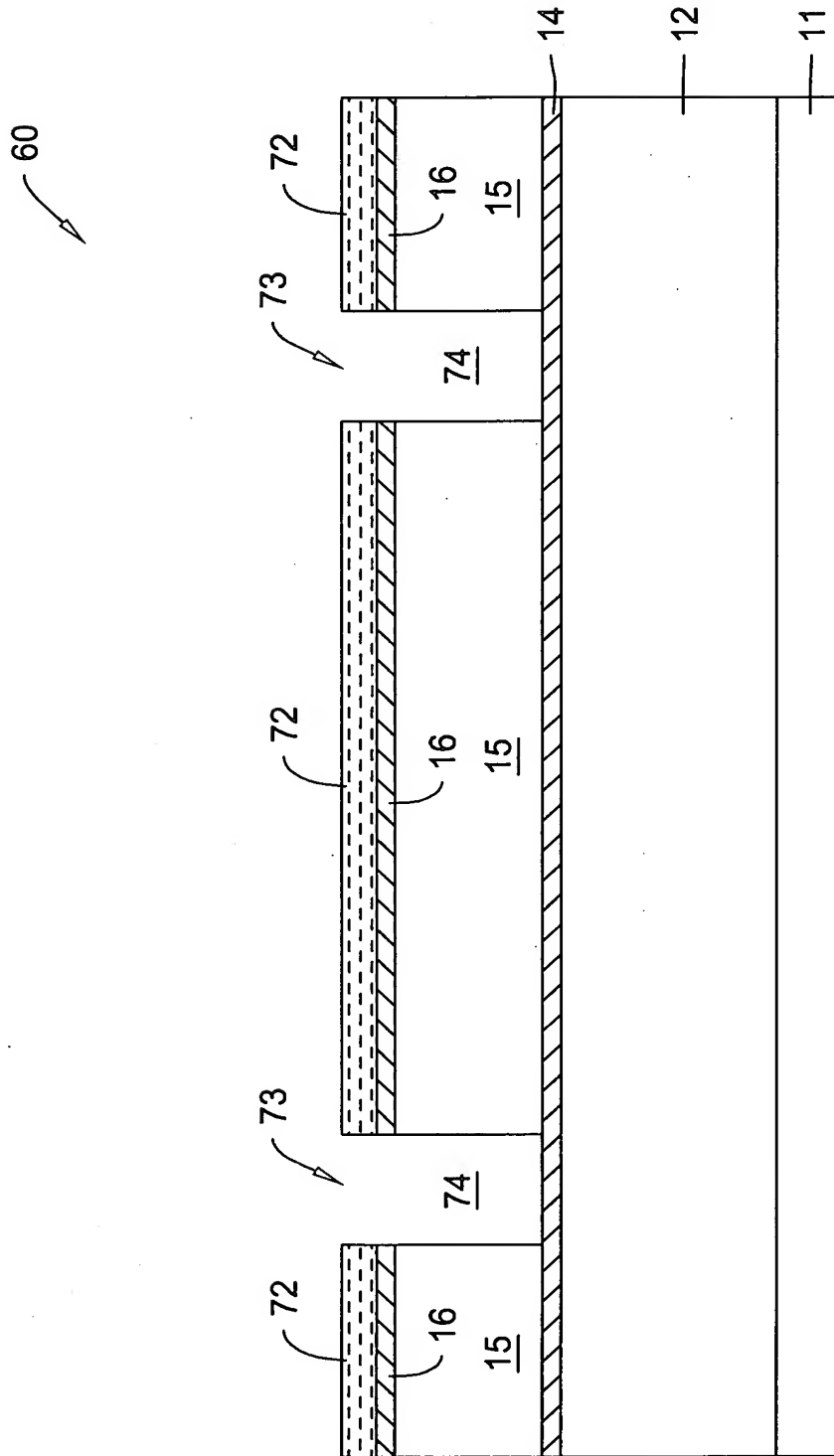


Figure 84

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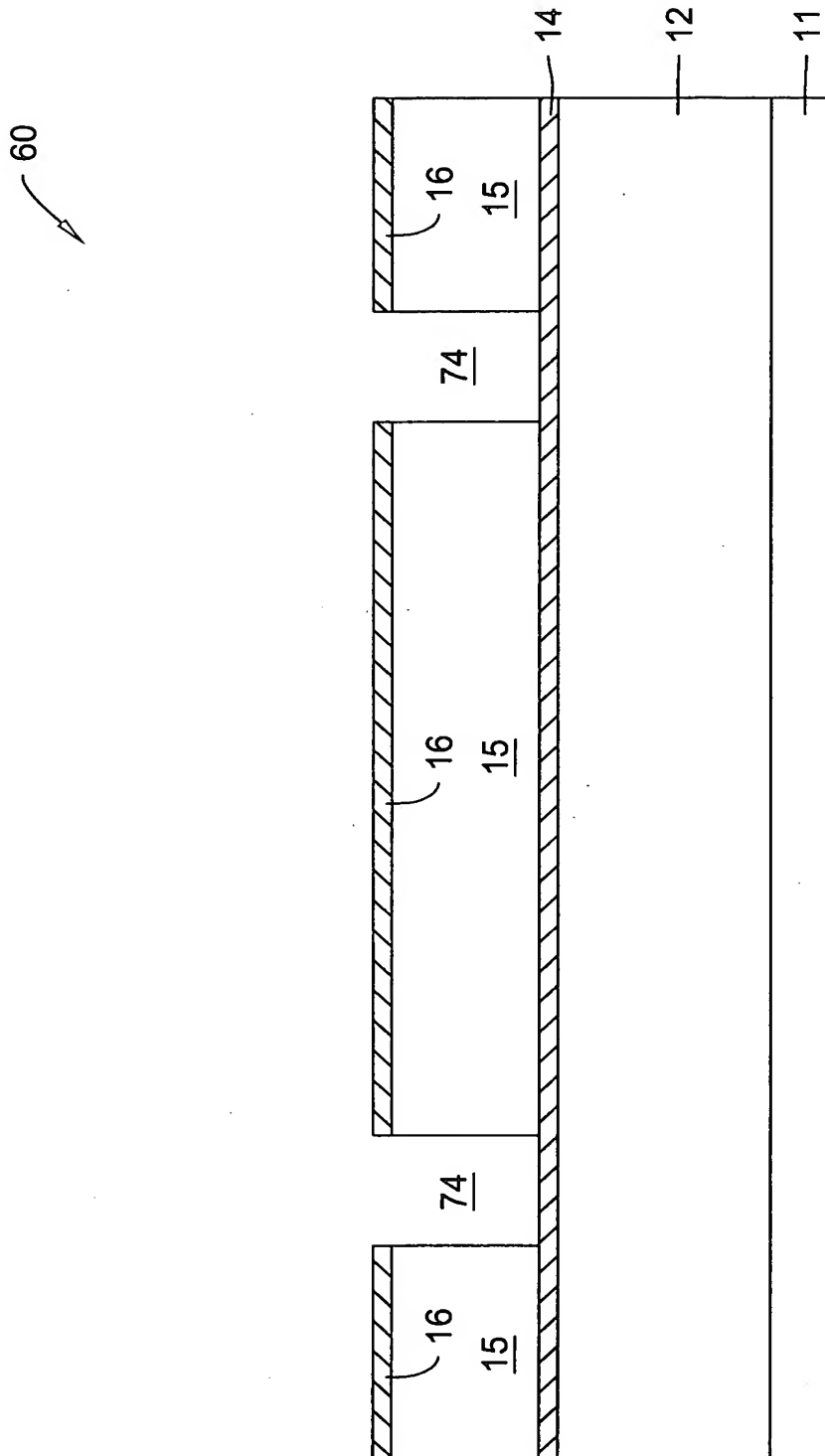


Figure 85

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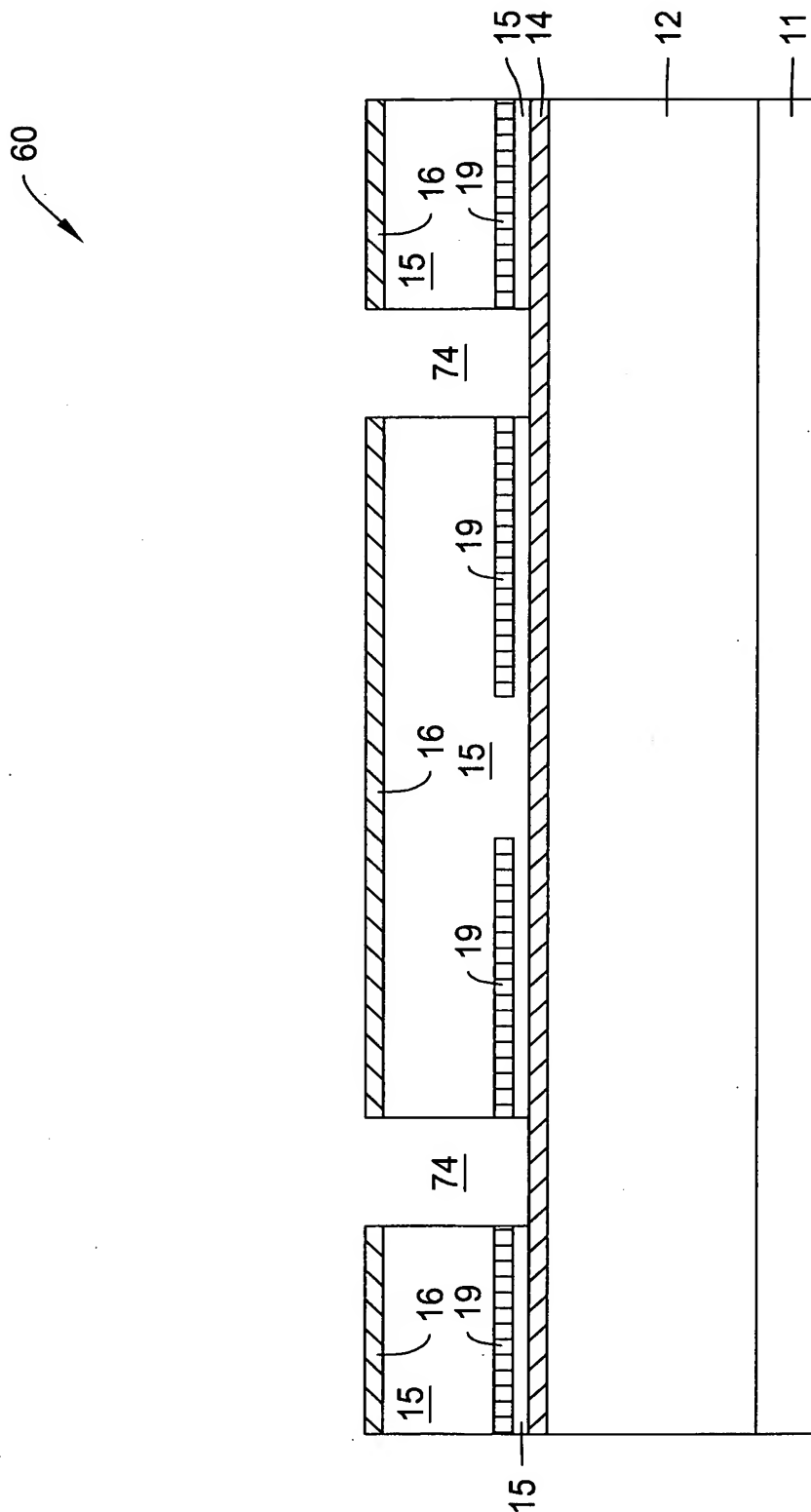


Figure 86

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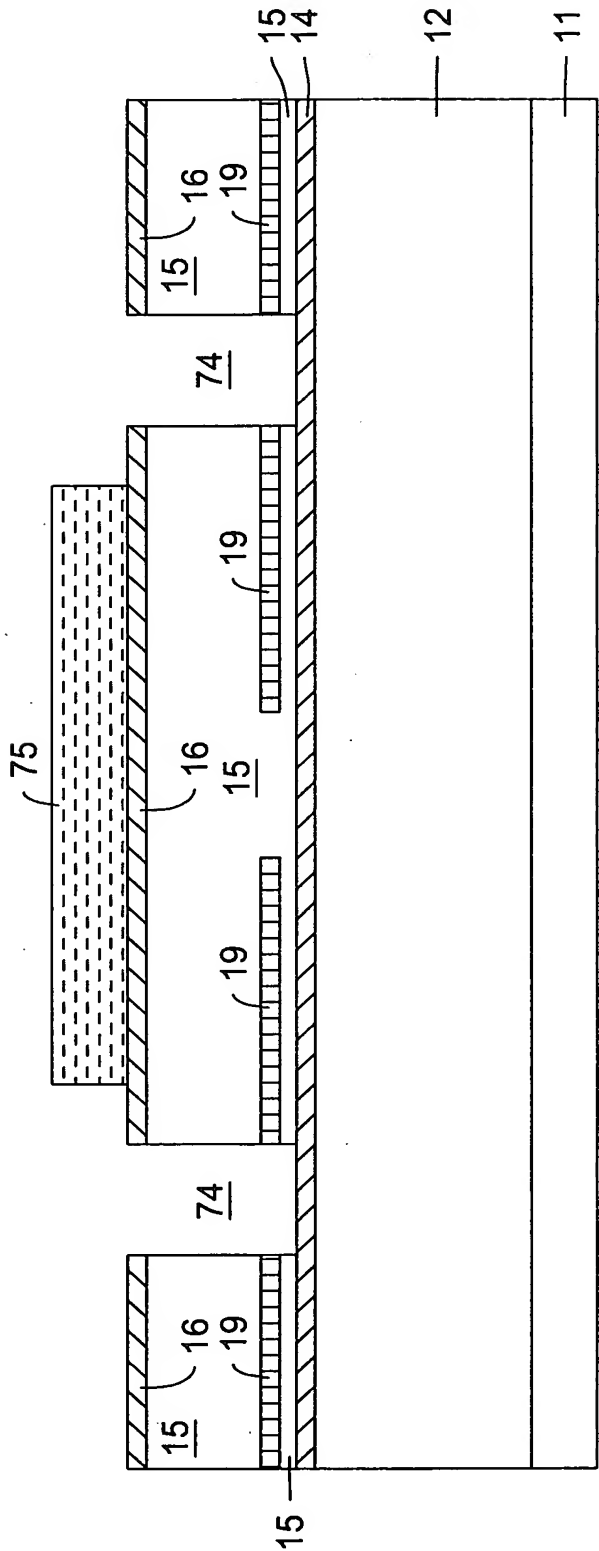
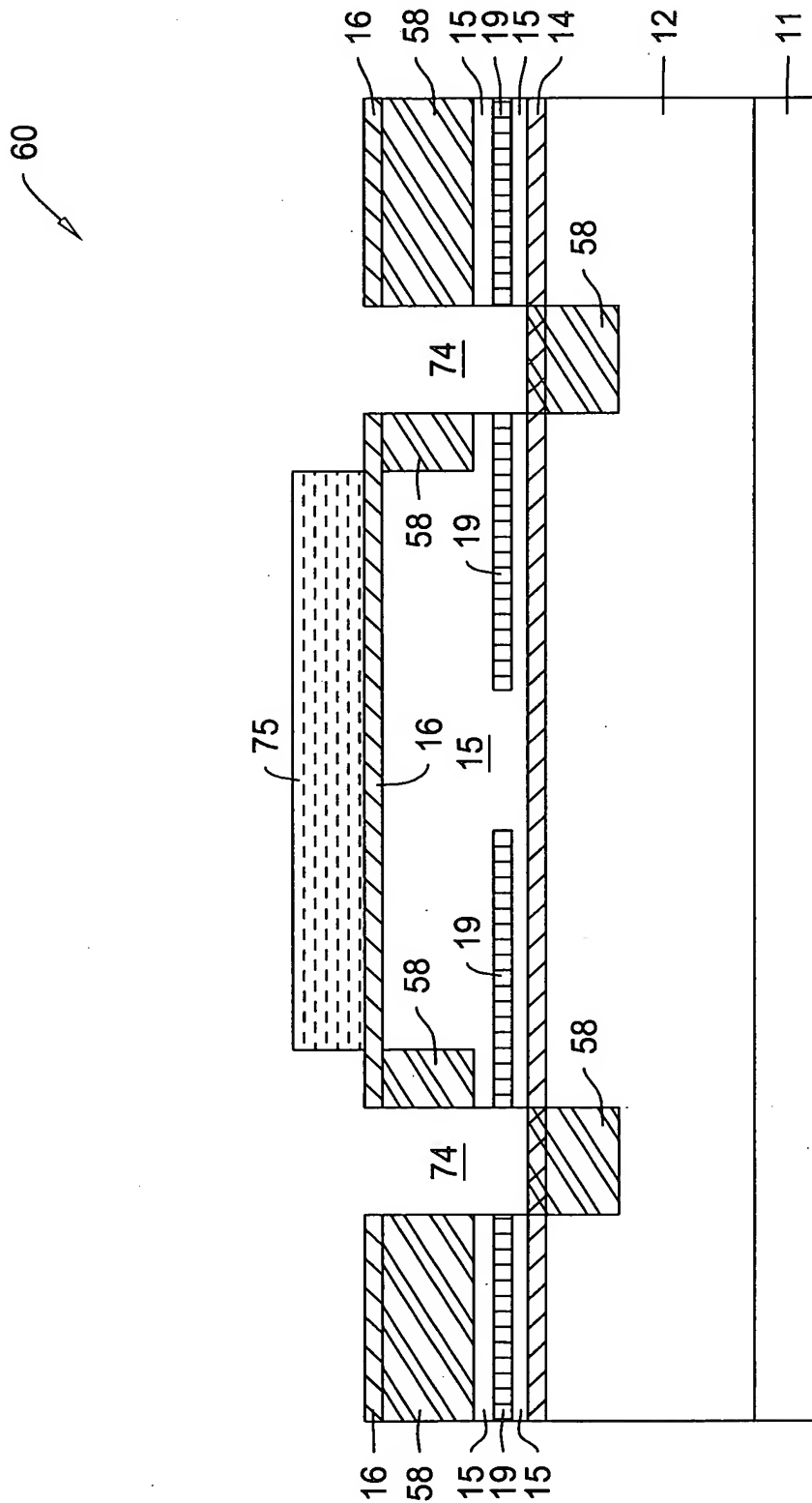
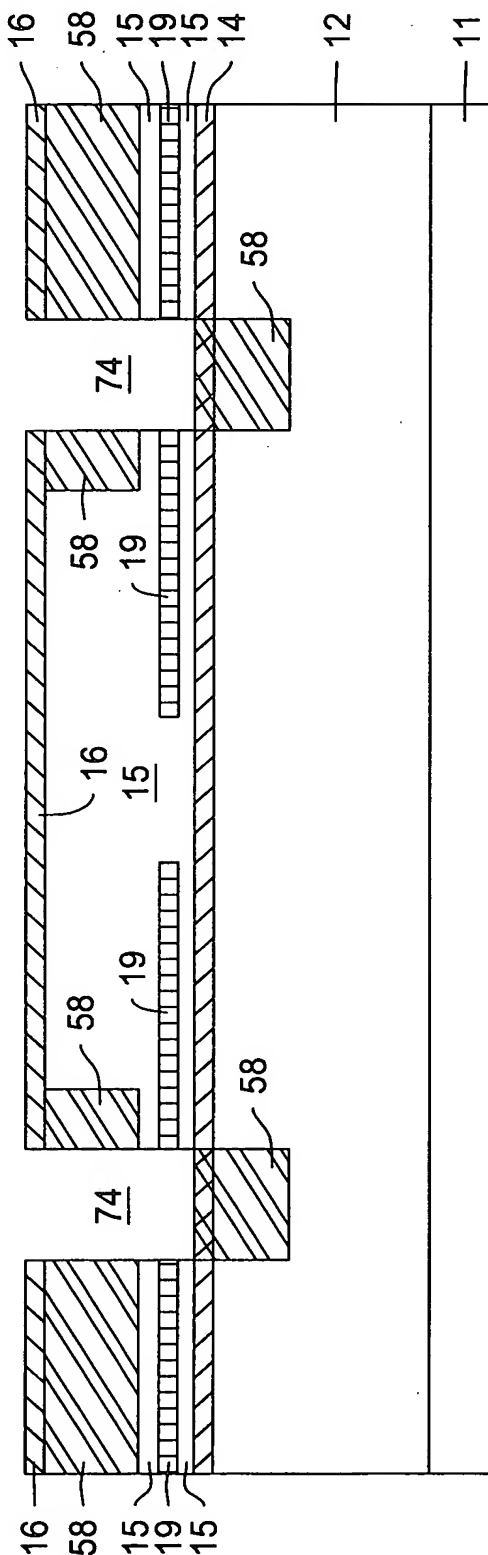


Figure 87





60

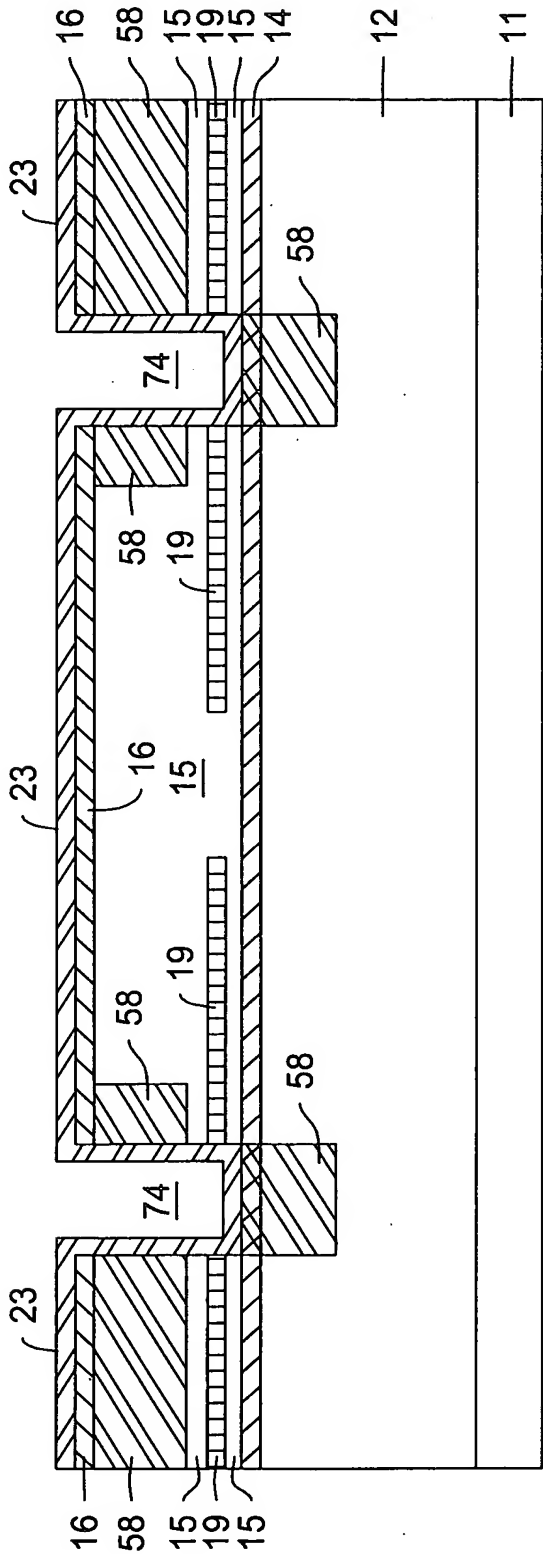


Figure 90

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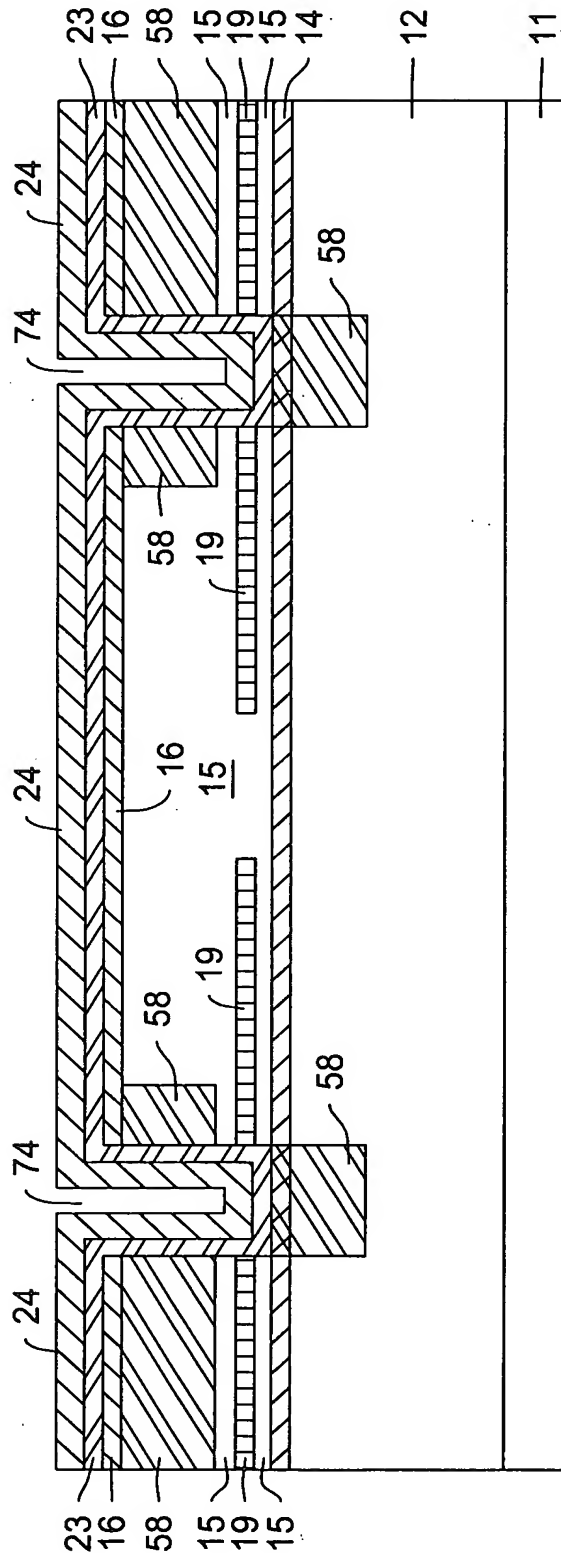


Figure 91



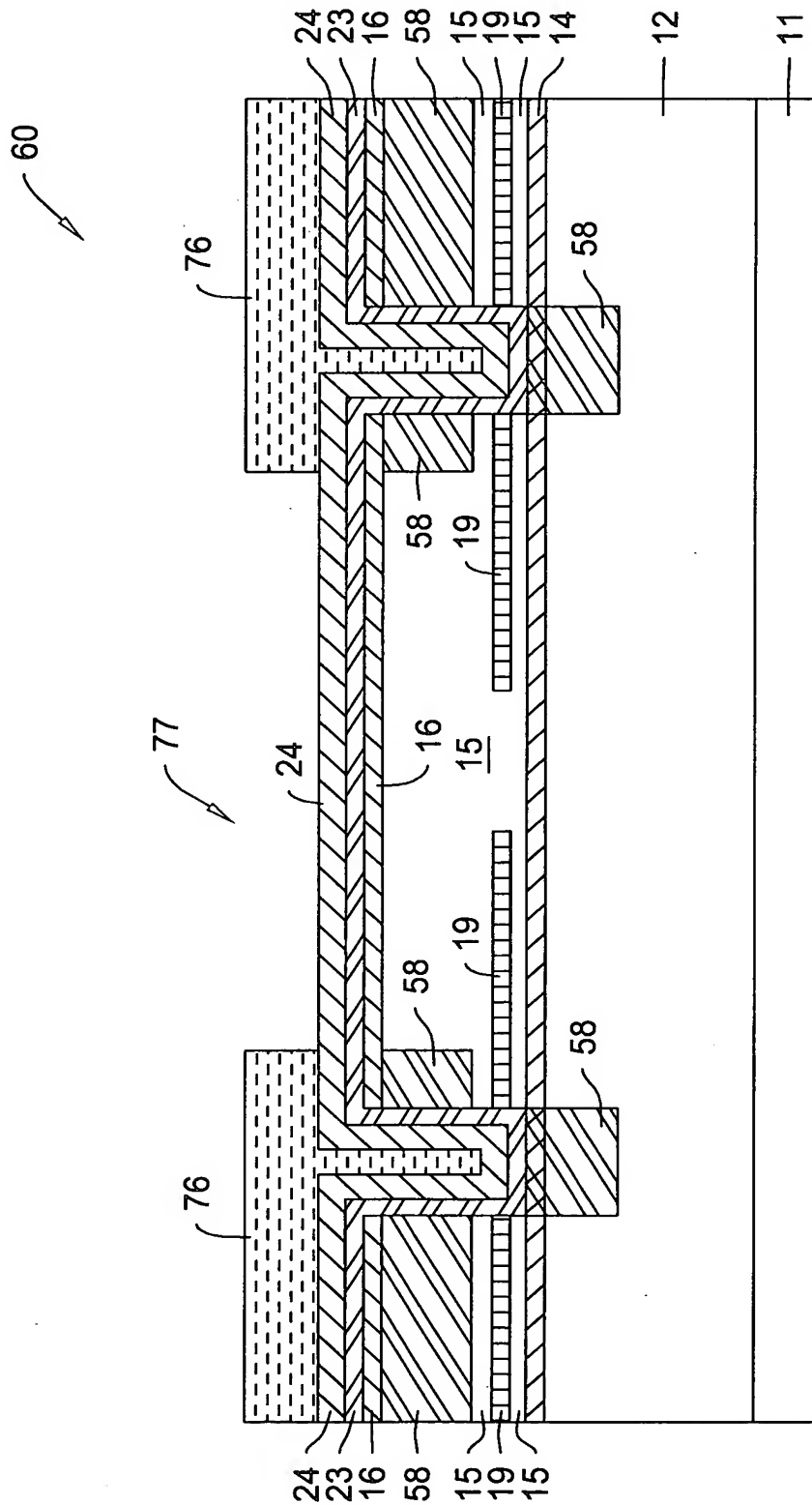


Figure 92

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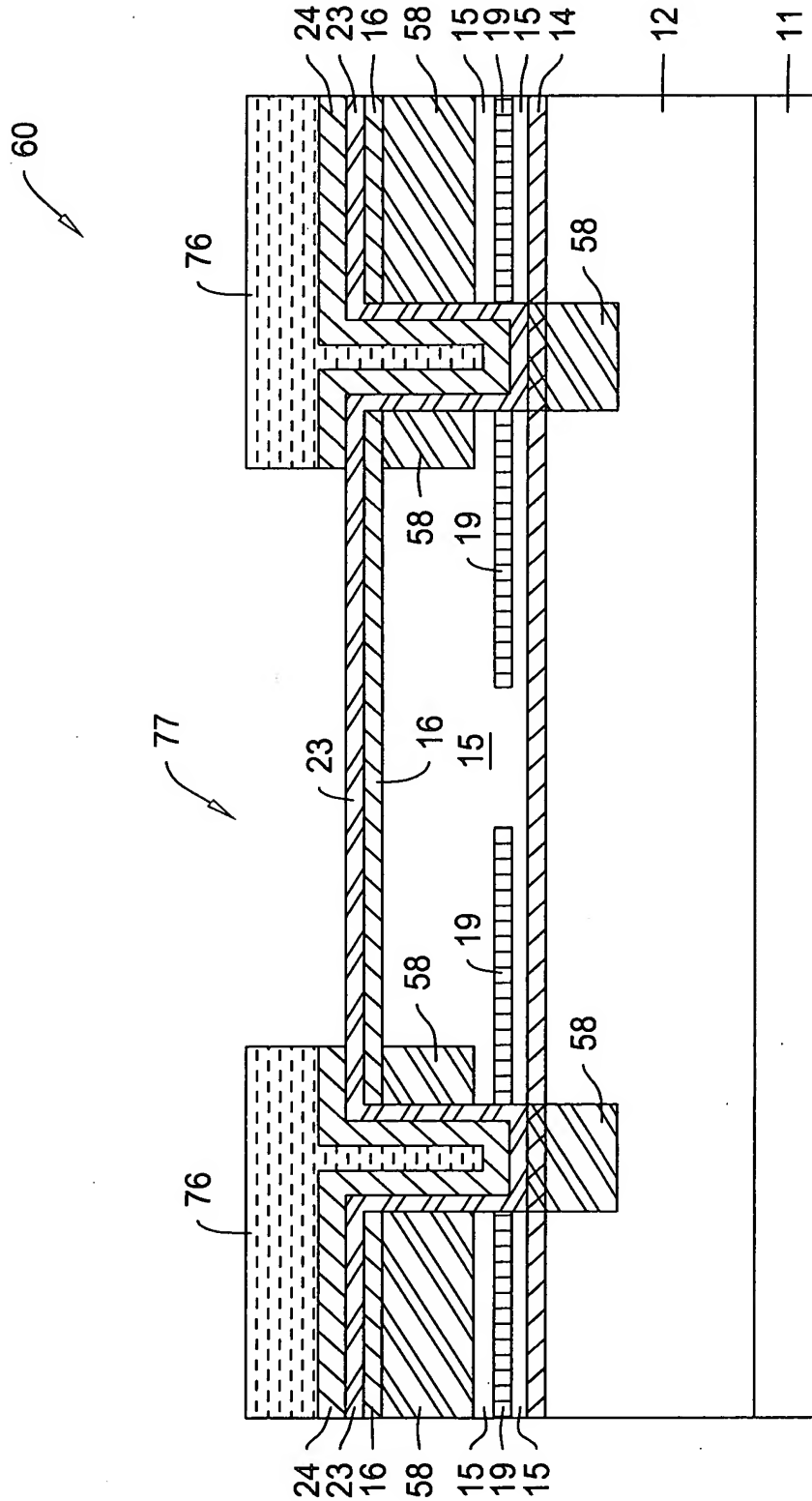


Figure 93

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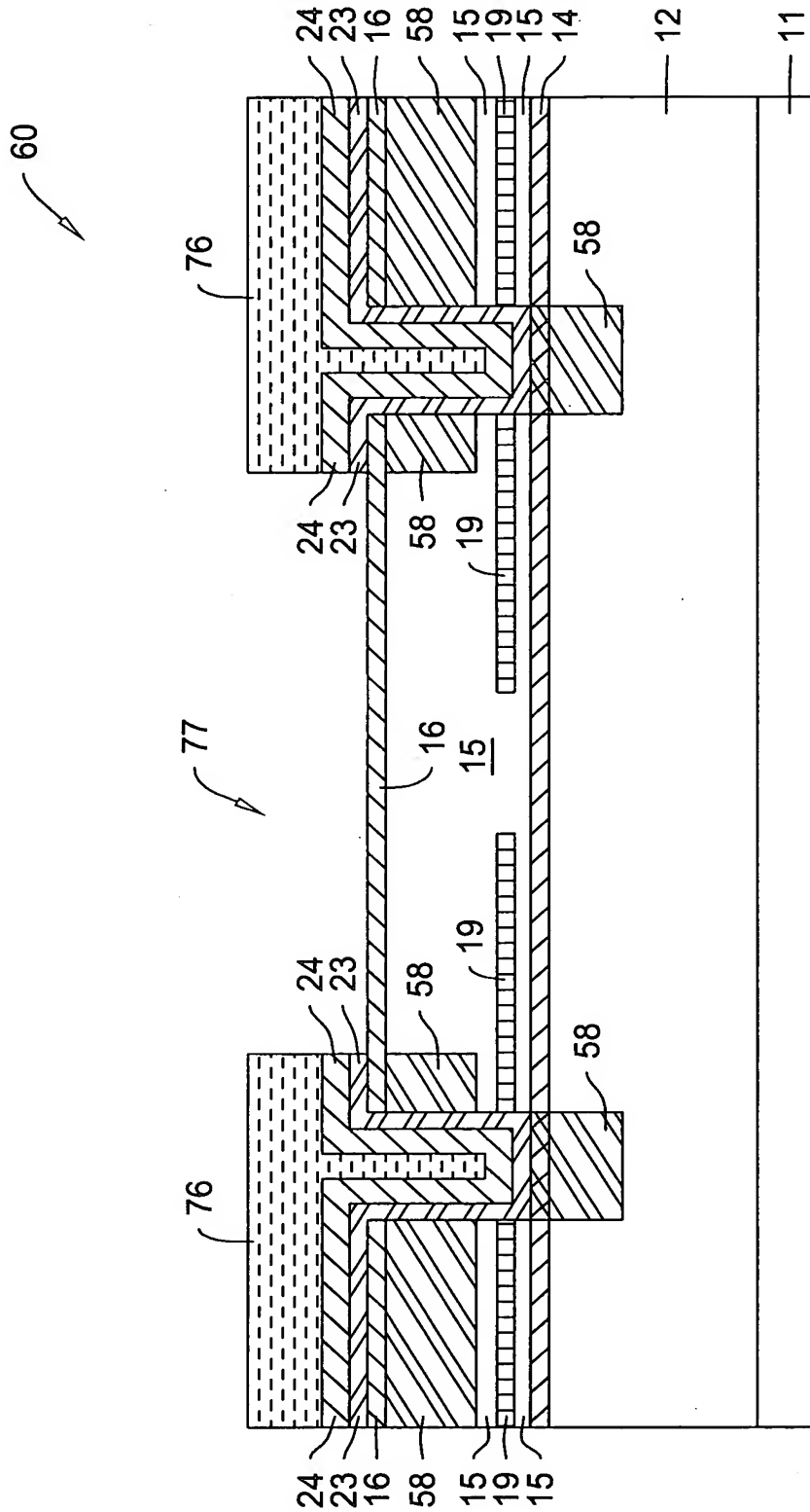


Figure 94

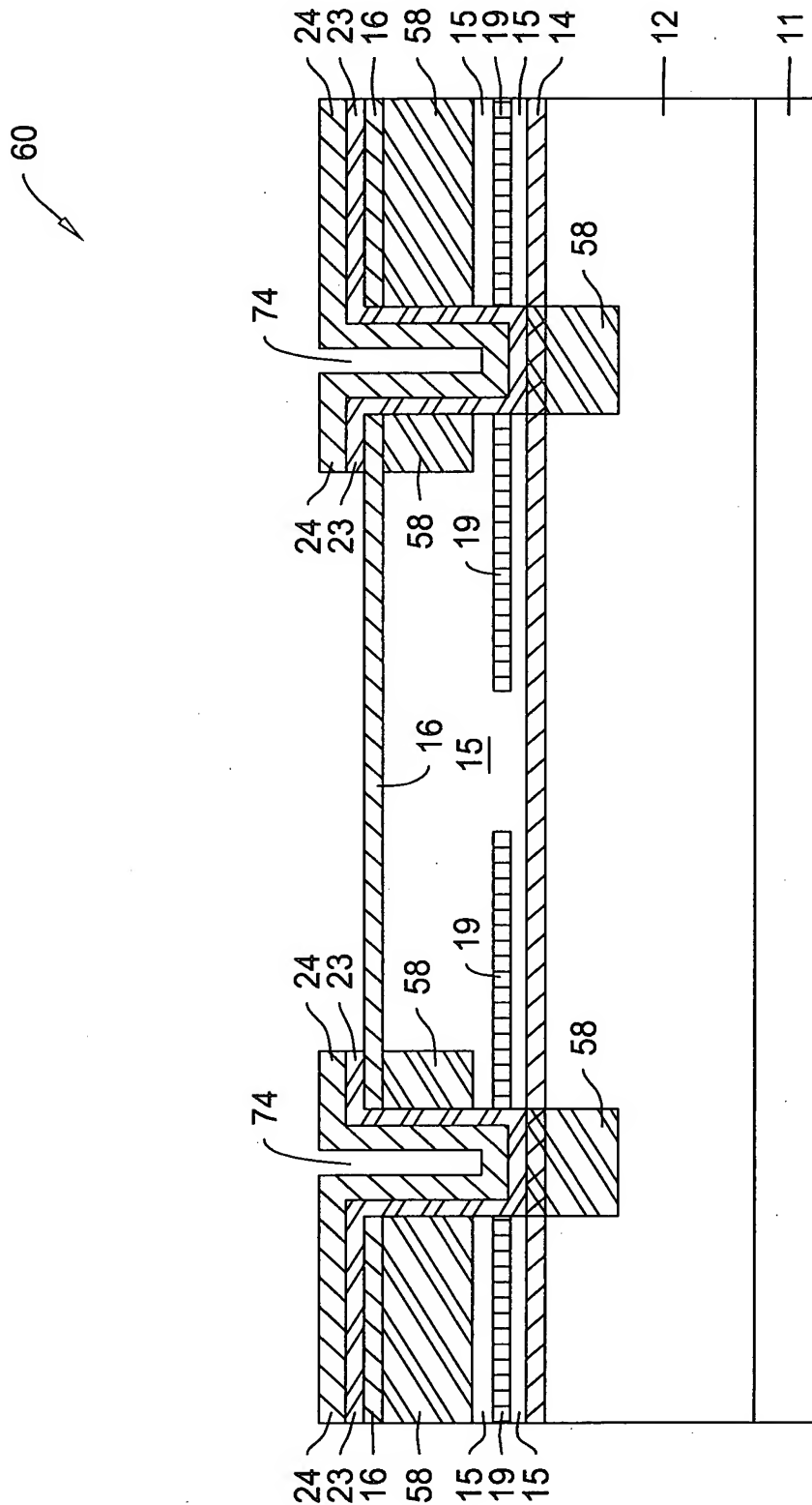


Figure 95

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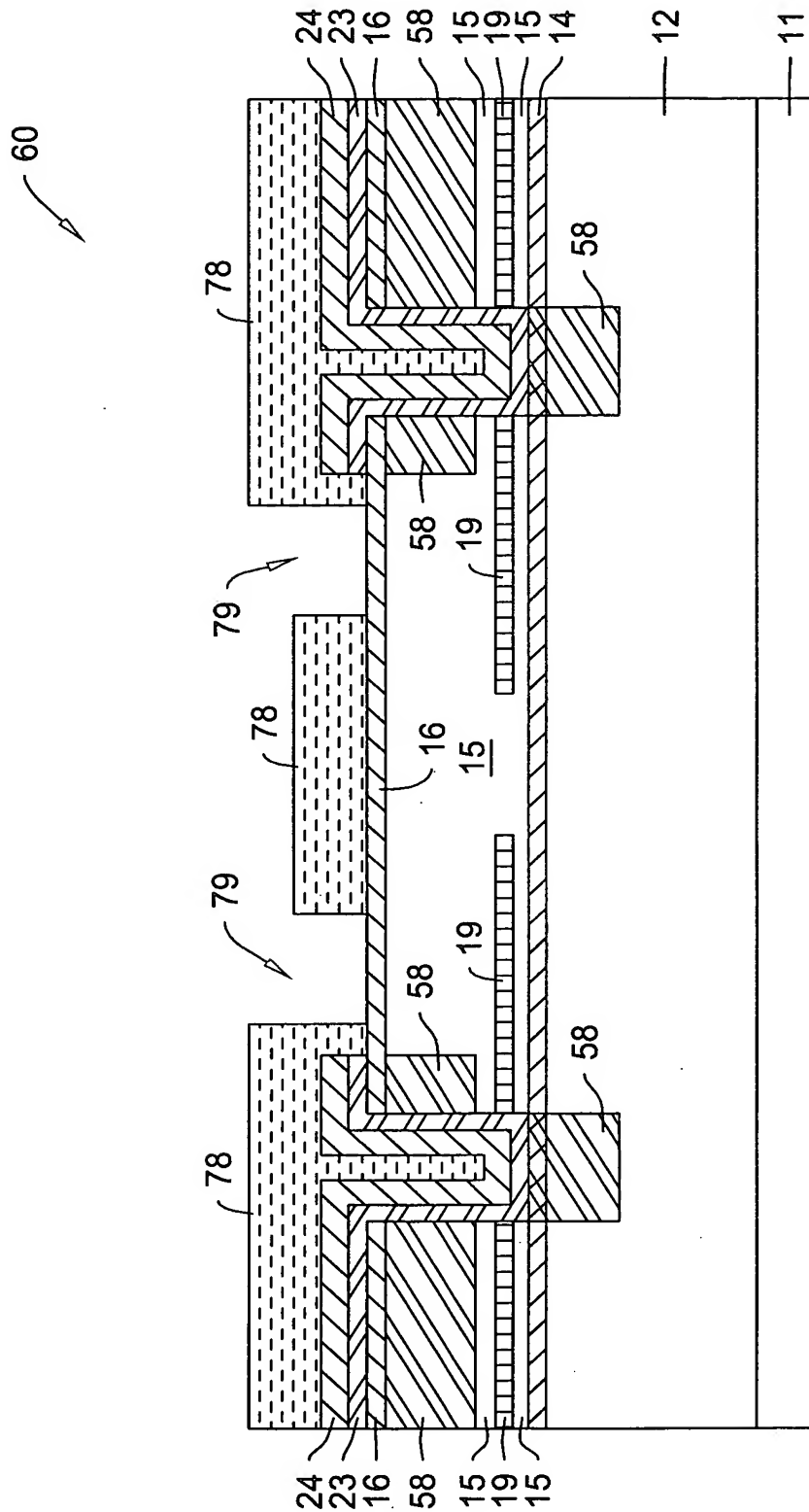


Figure 96

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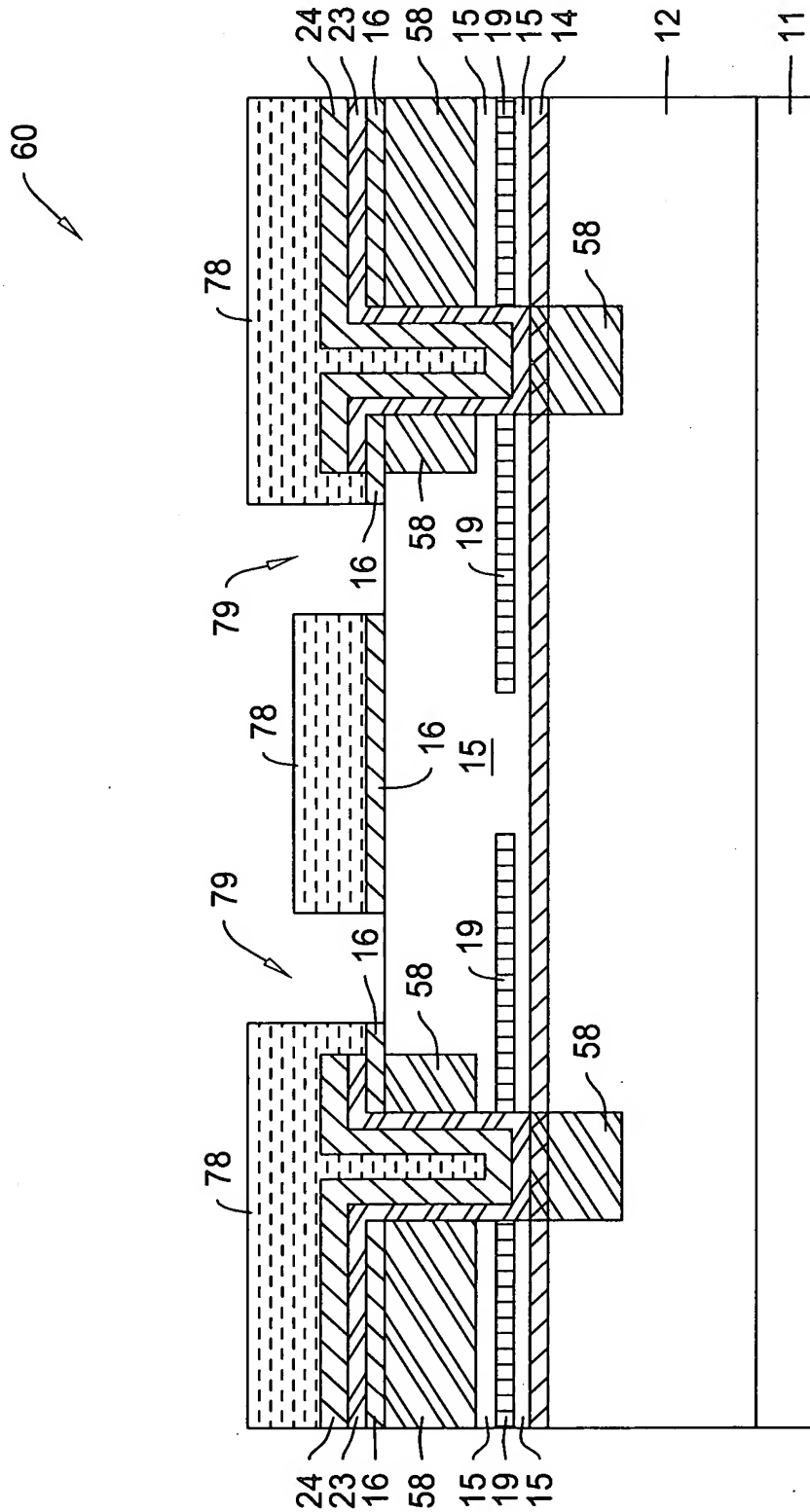


Figure 97

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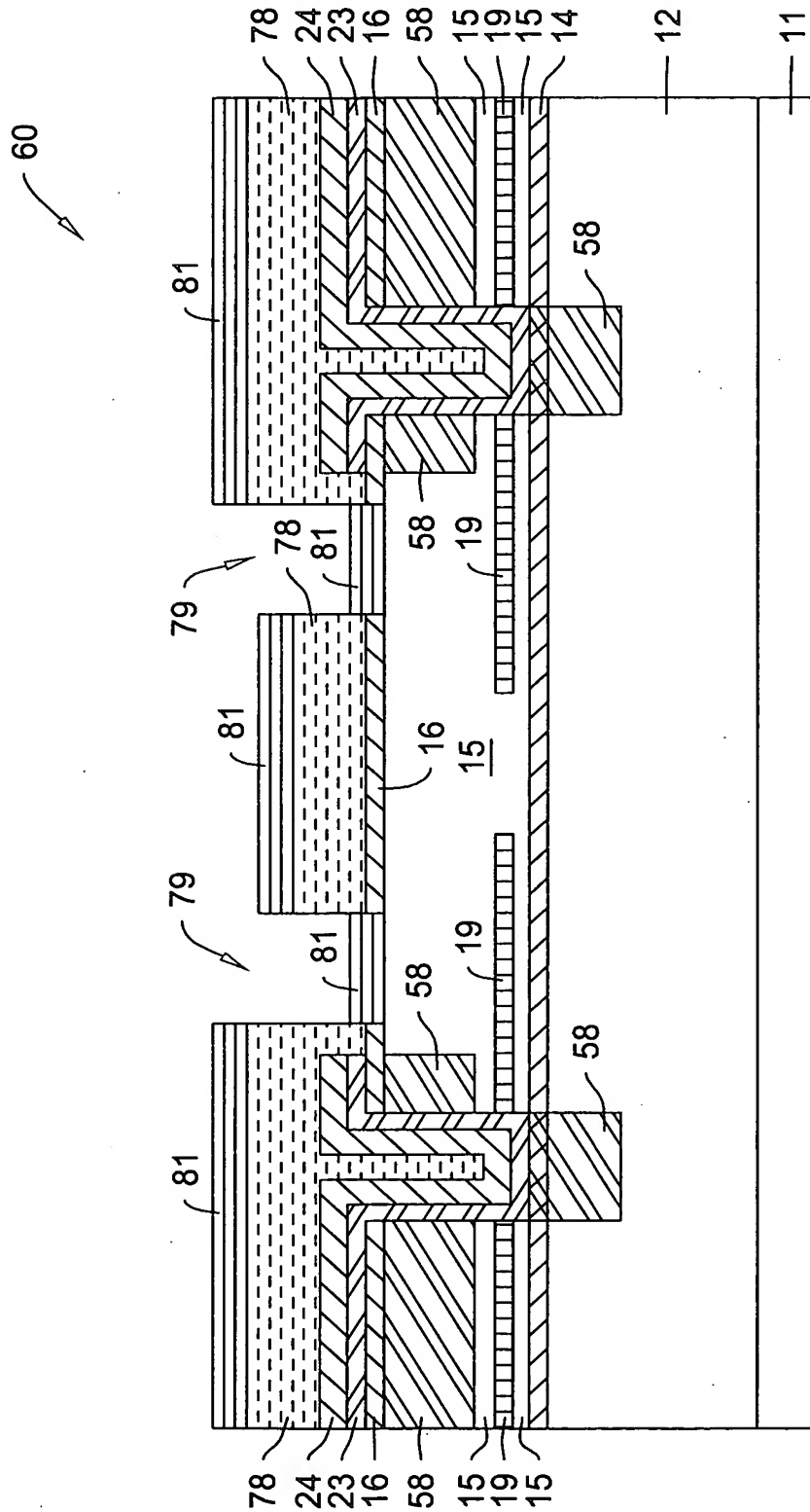
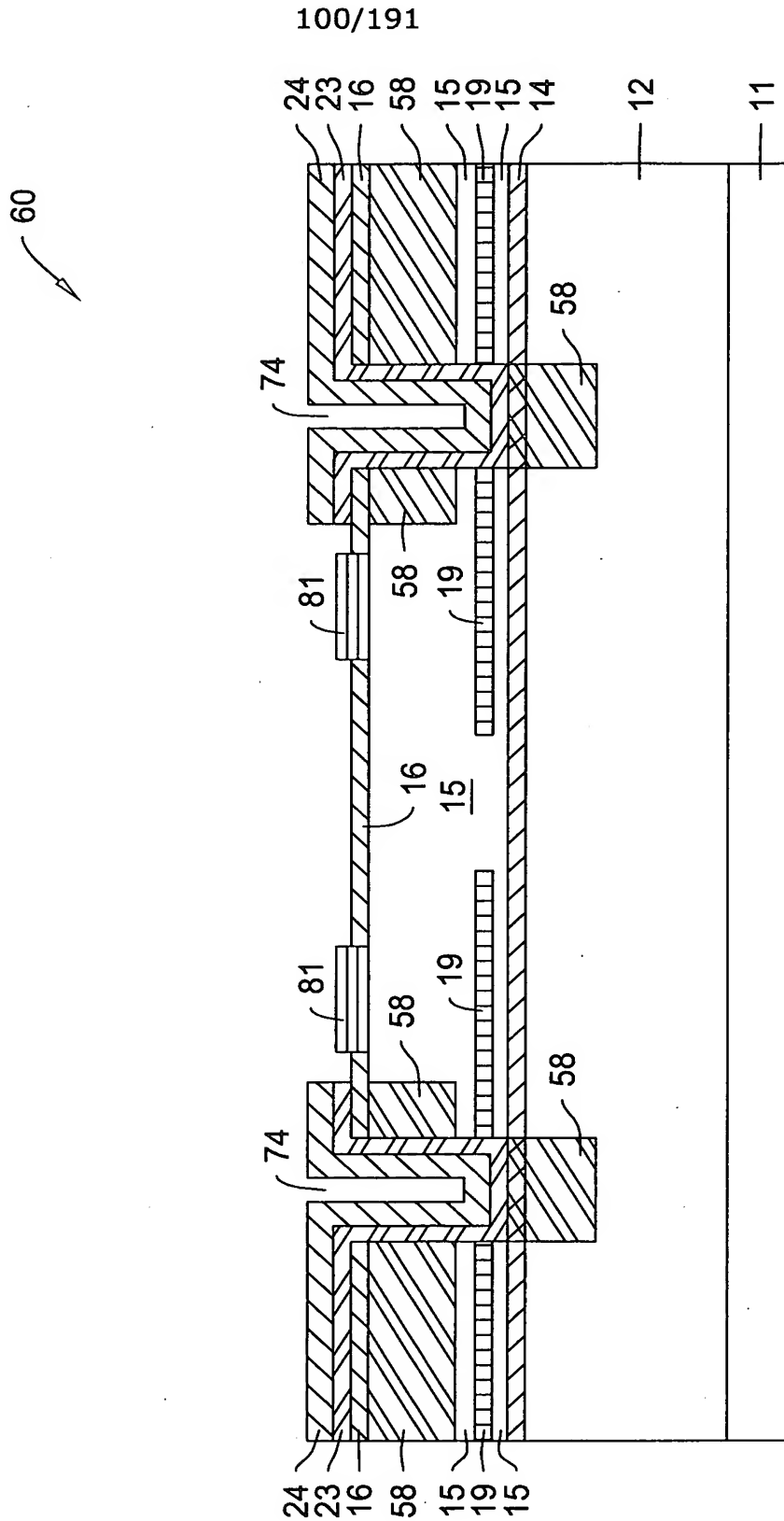


Figure 98





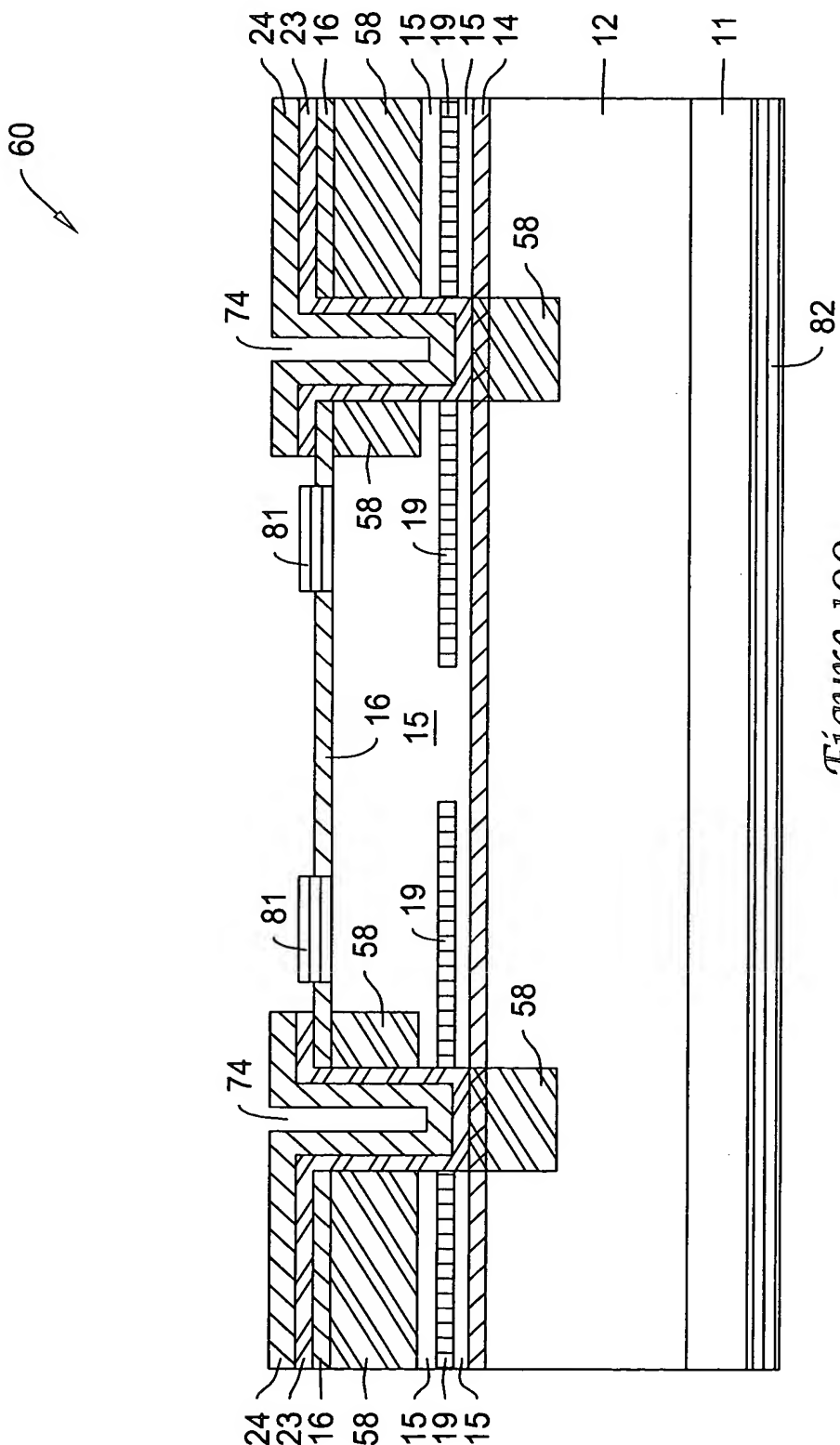
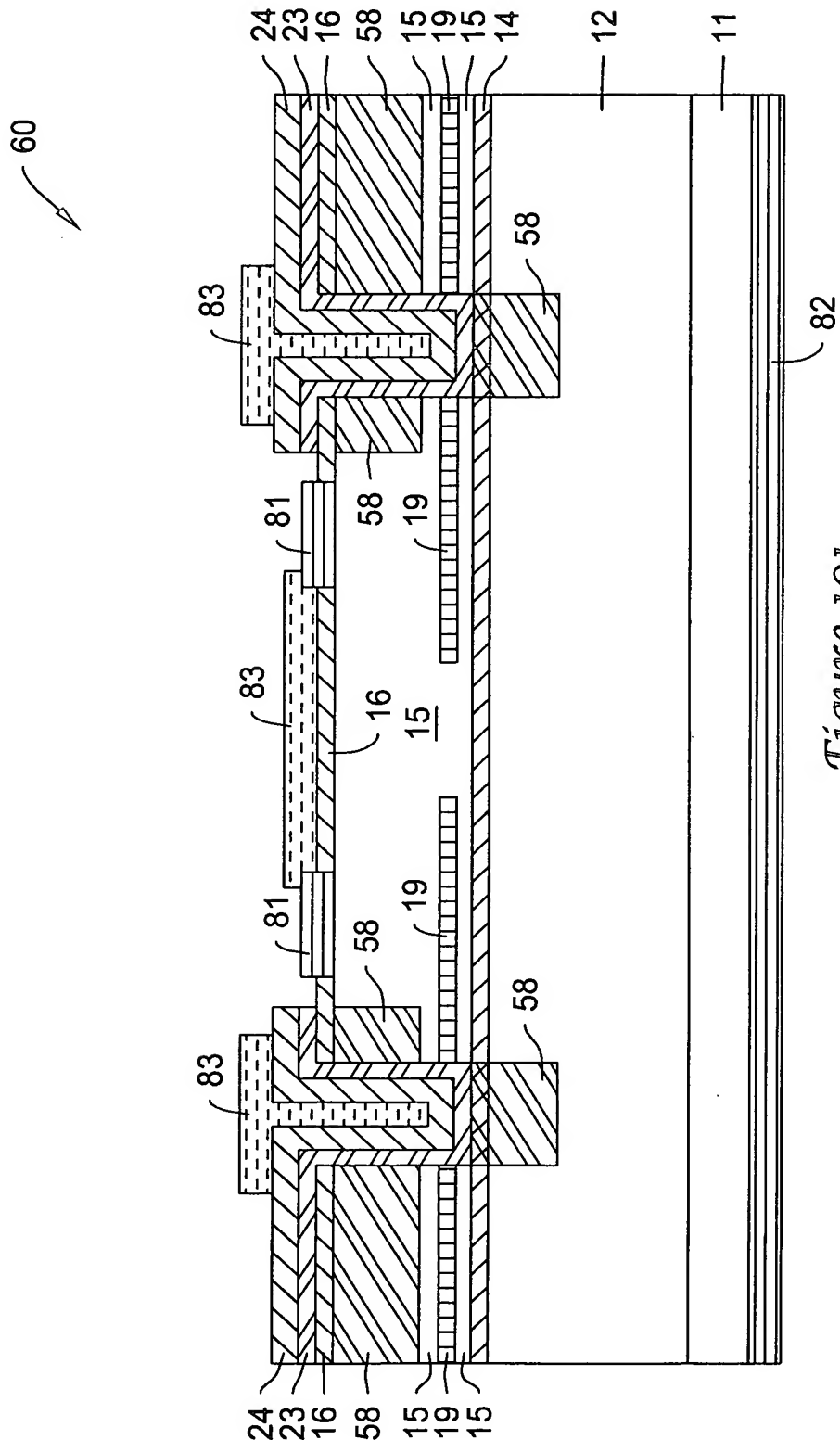


Figure 100



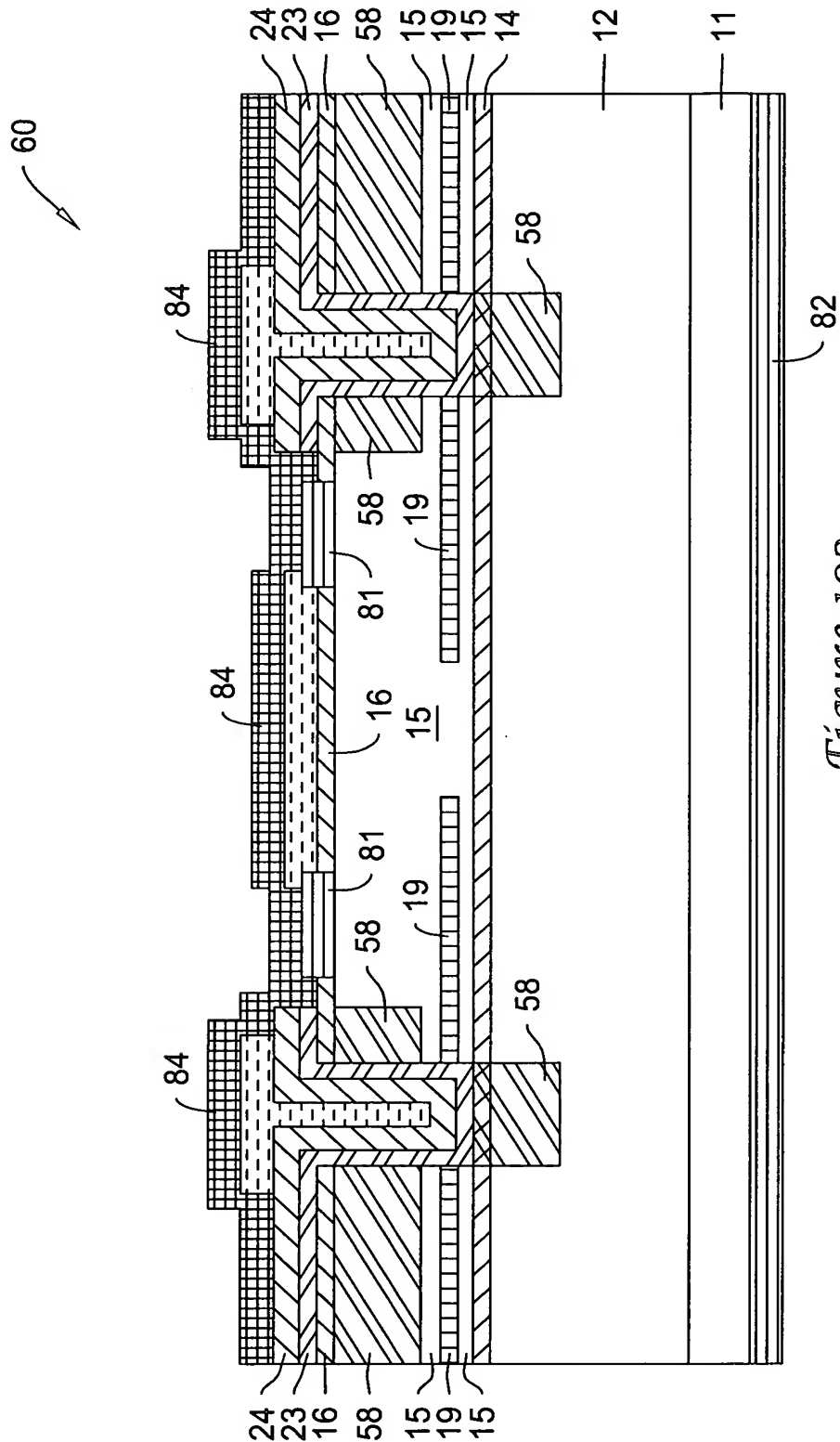


Figure 102

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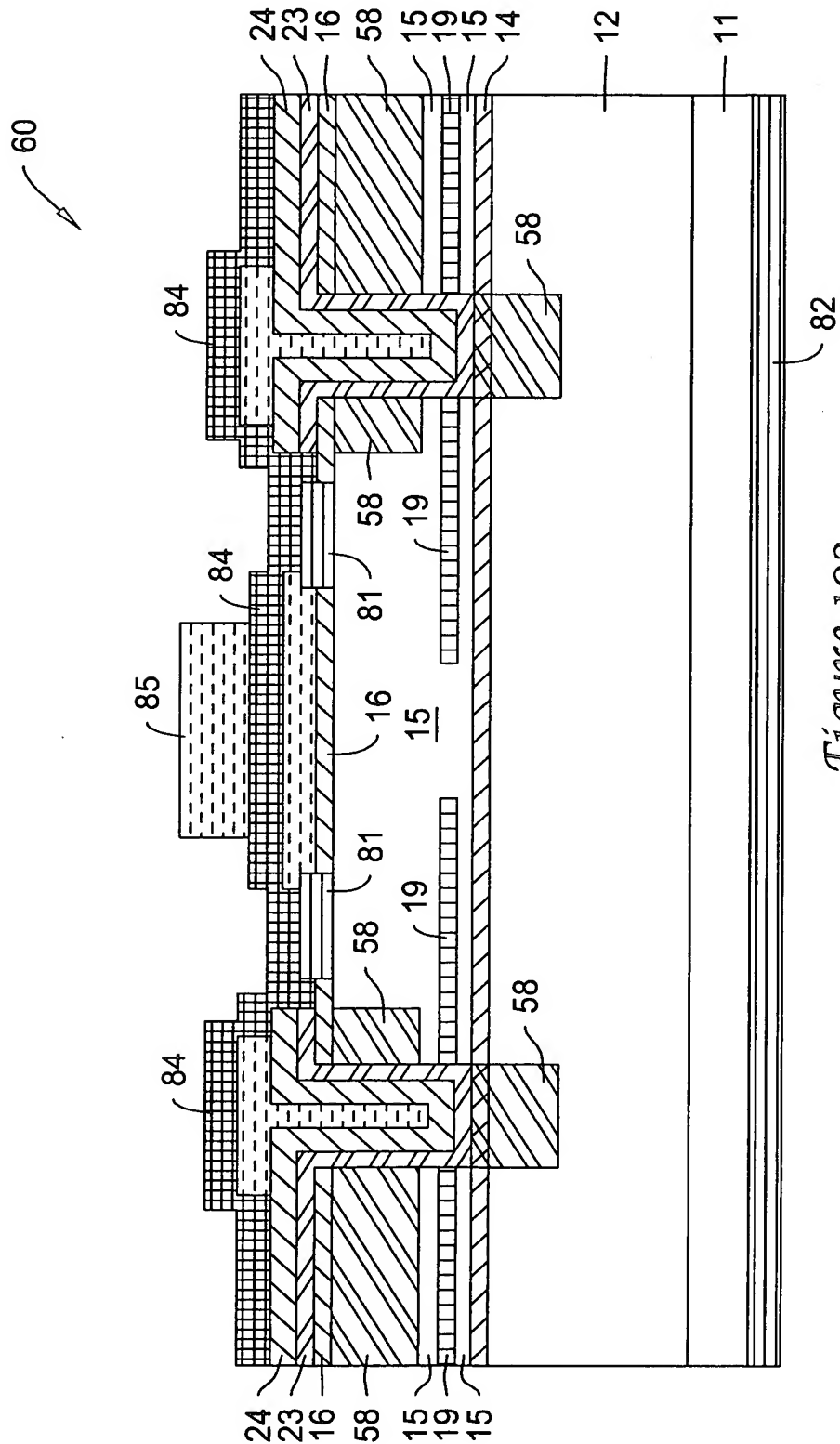


Figure 103

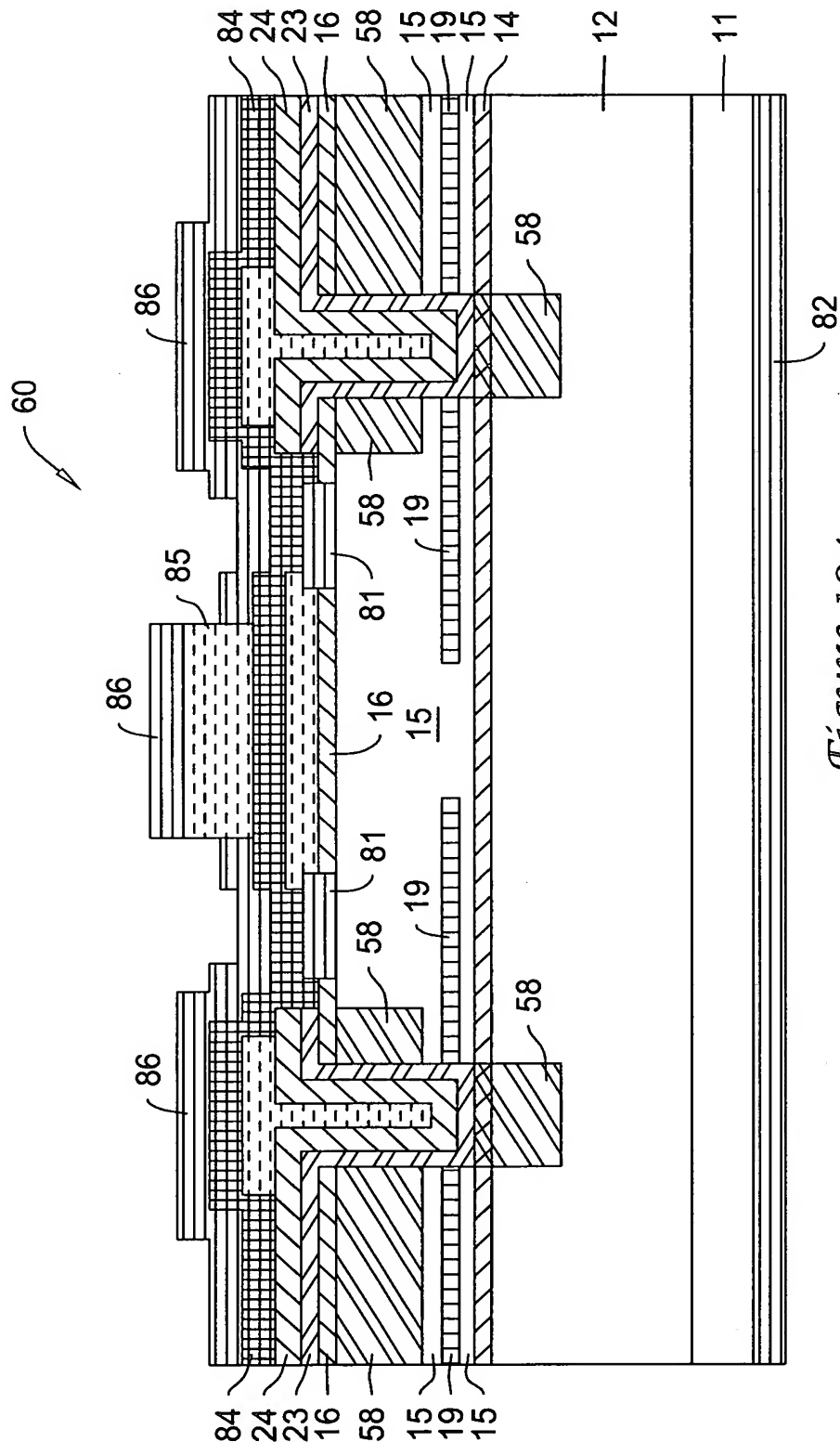
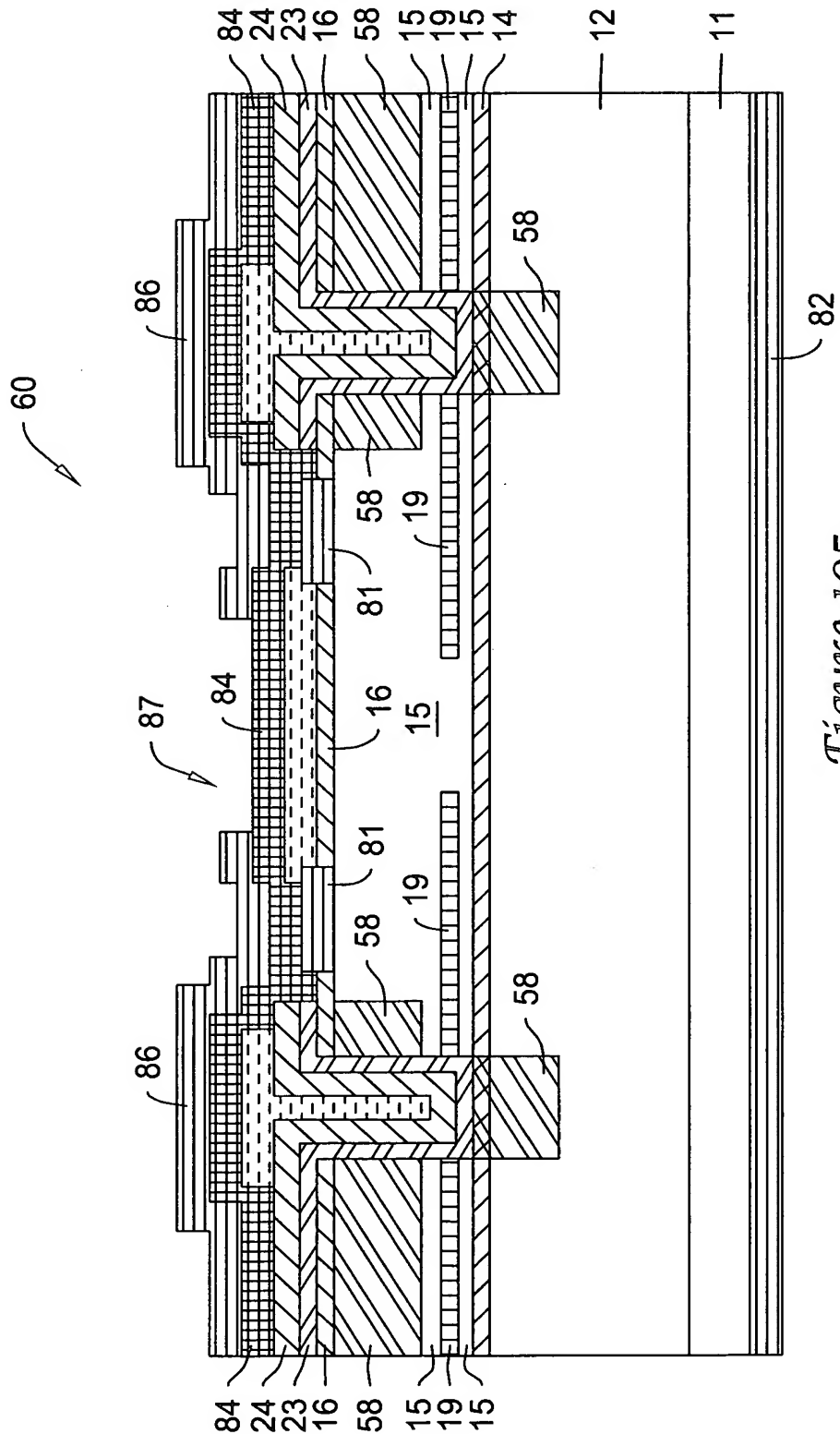


Figure 104



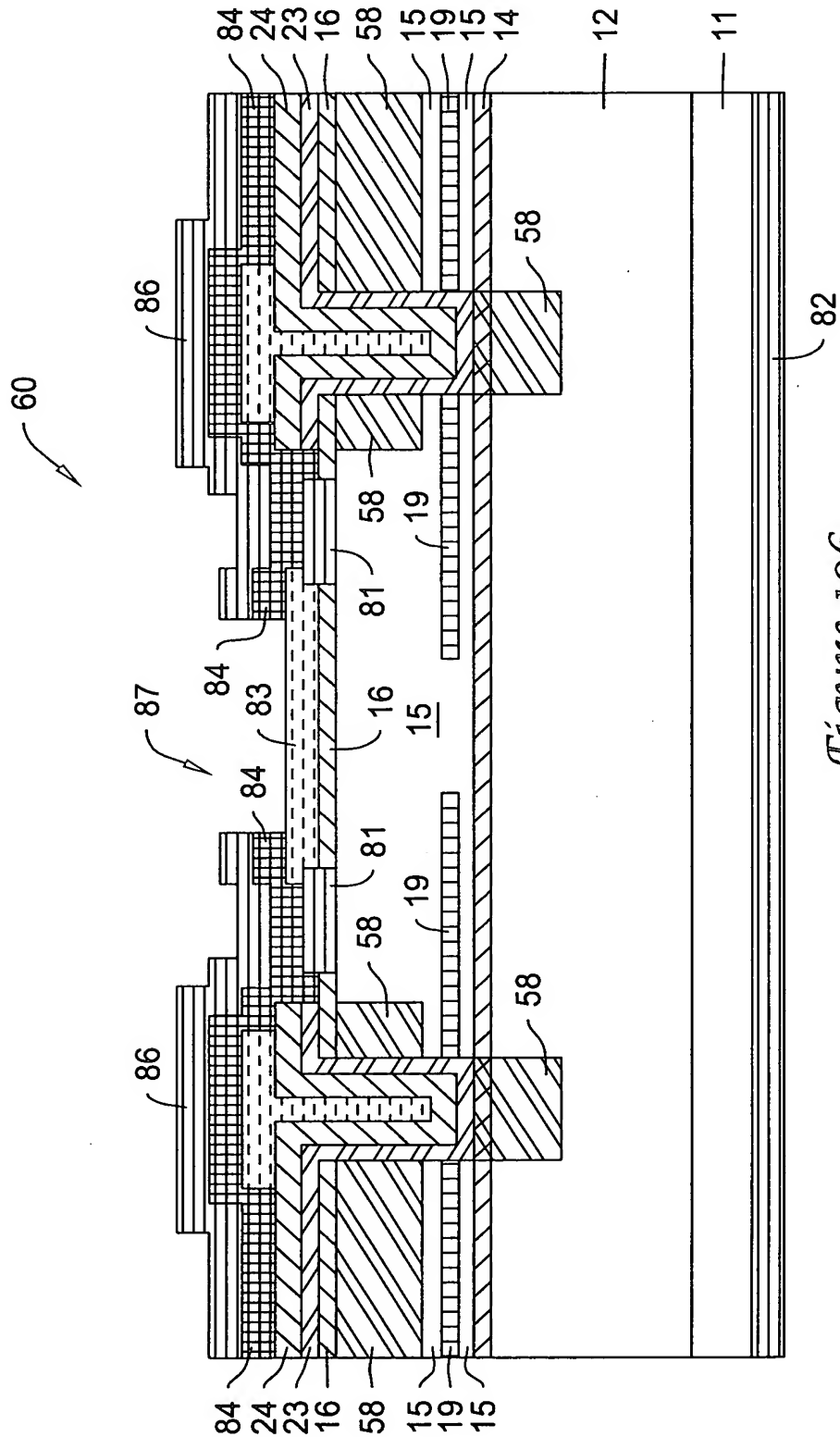


Figure 106

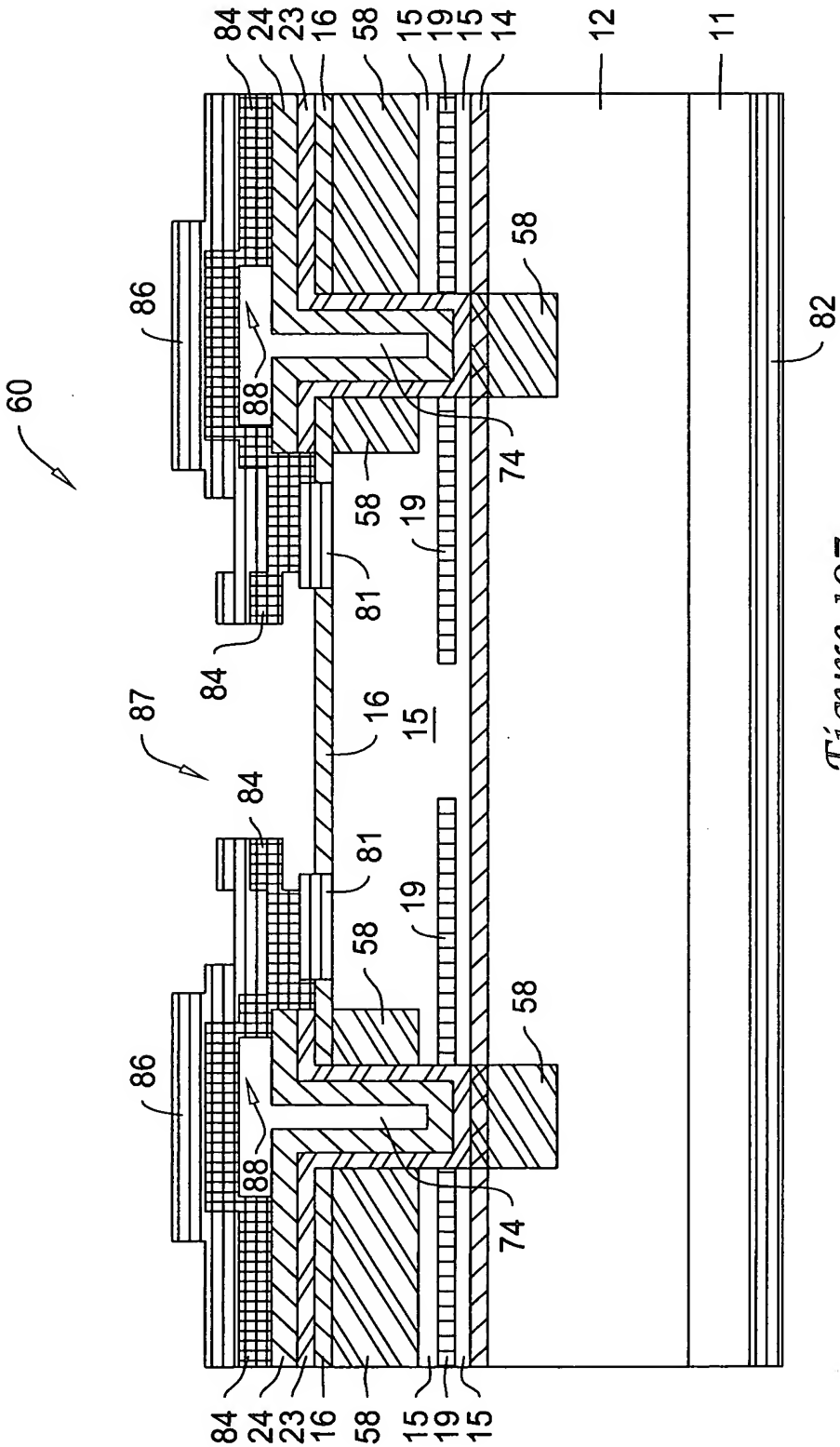


Figure 107



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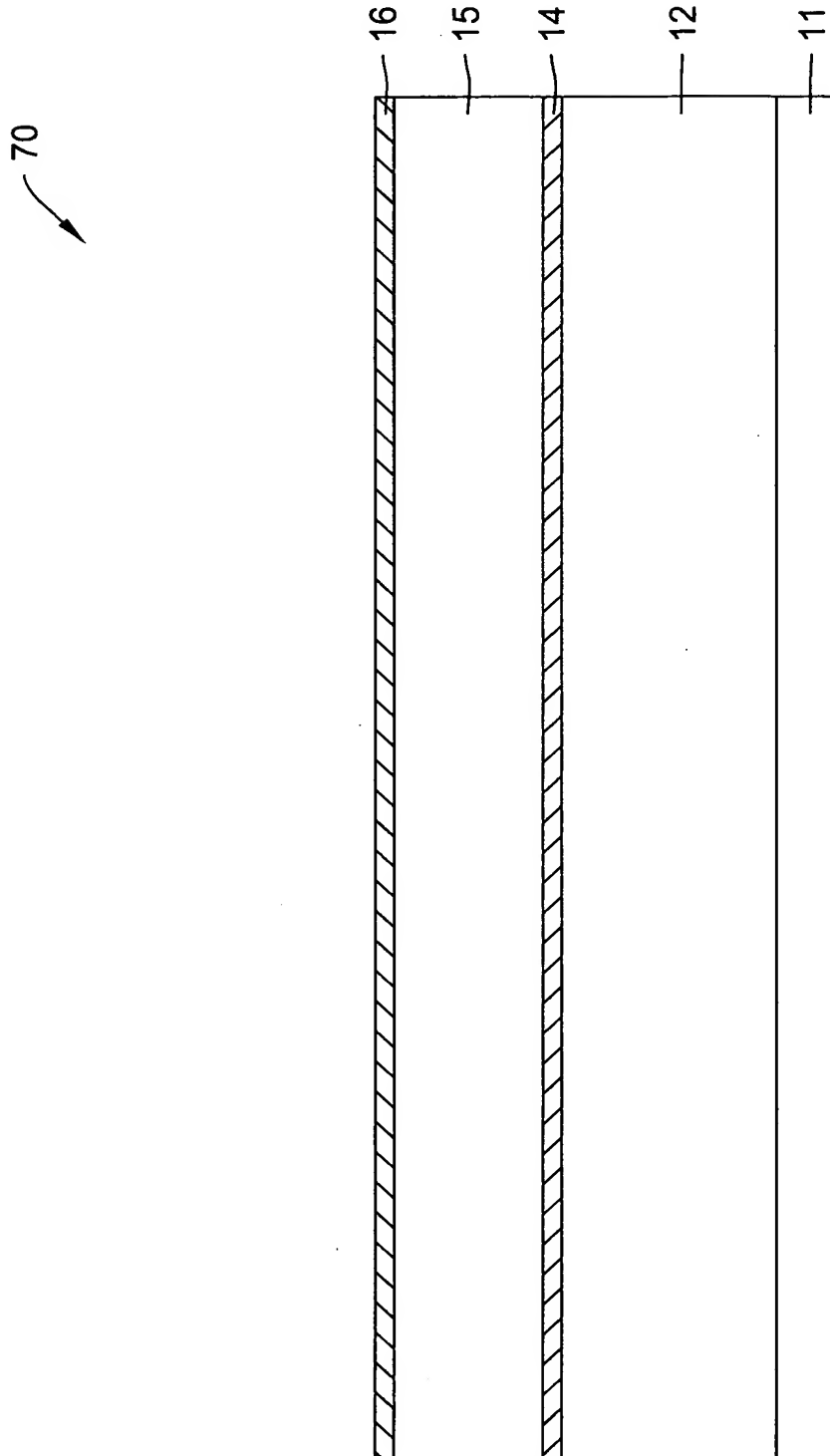


Figure 108

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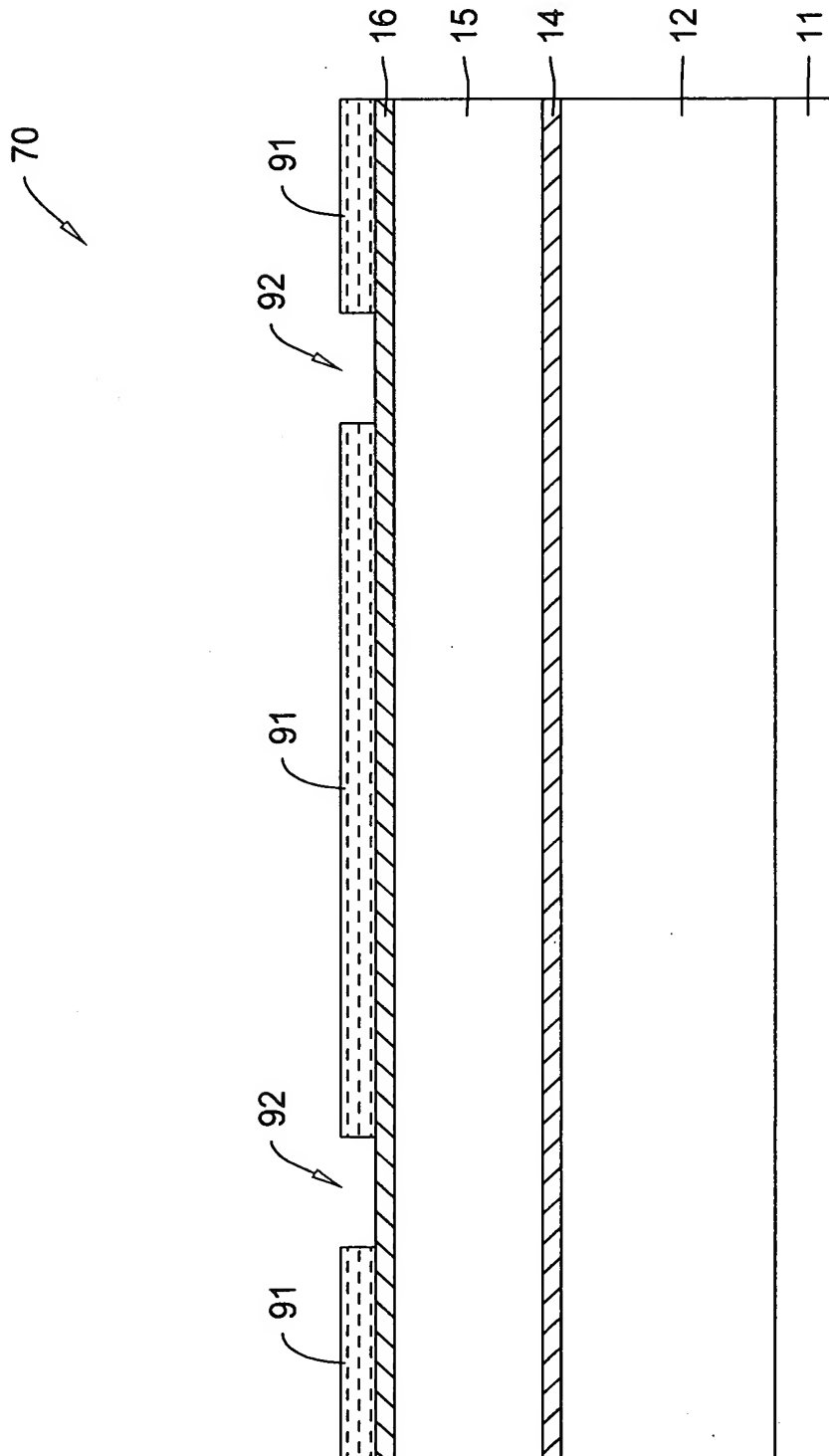
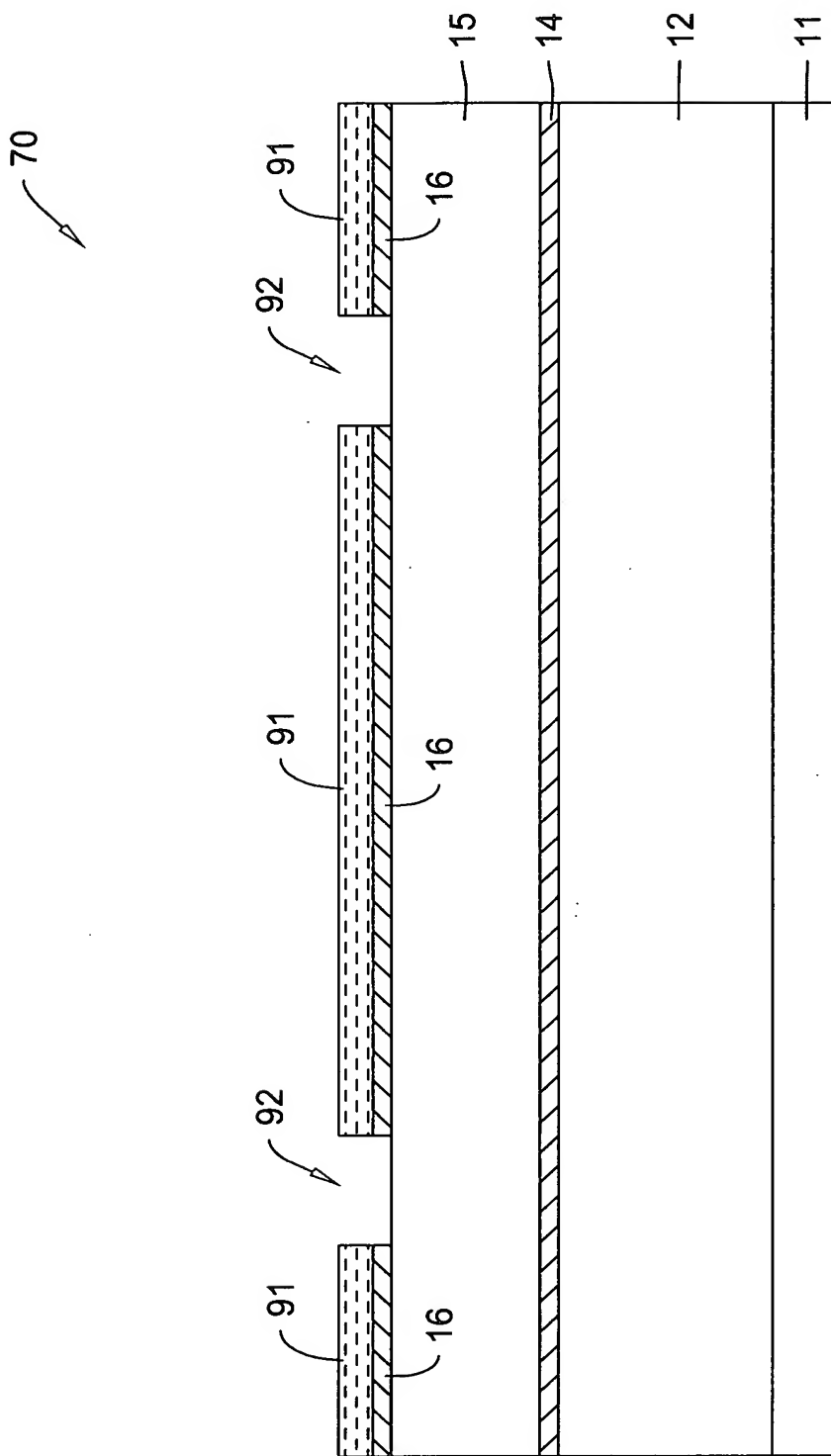


Figure 109



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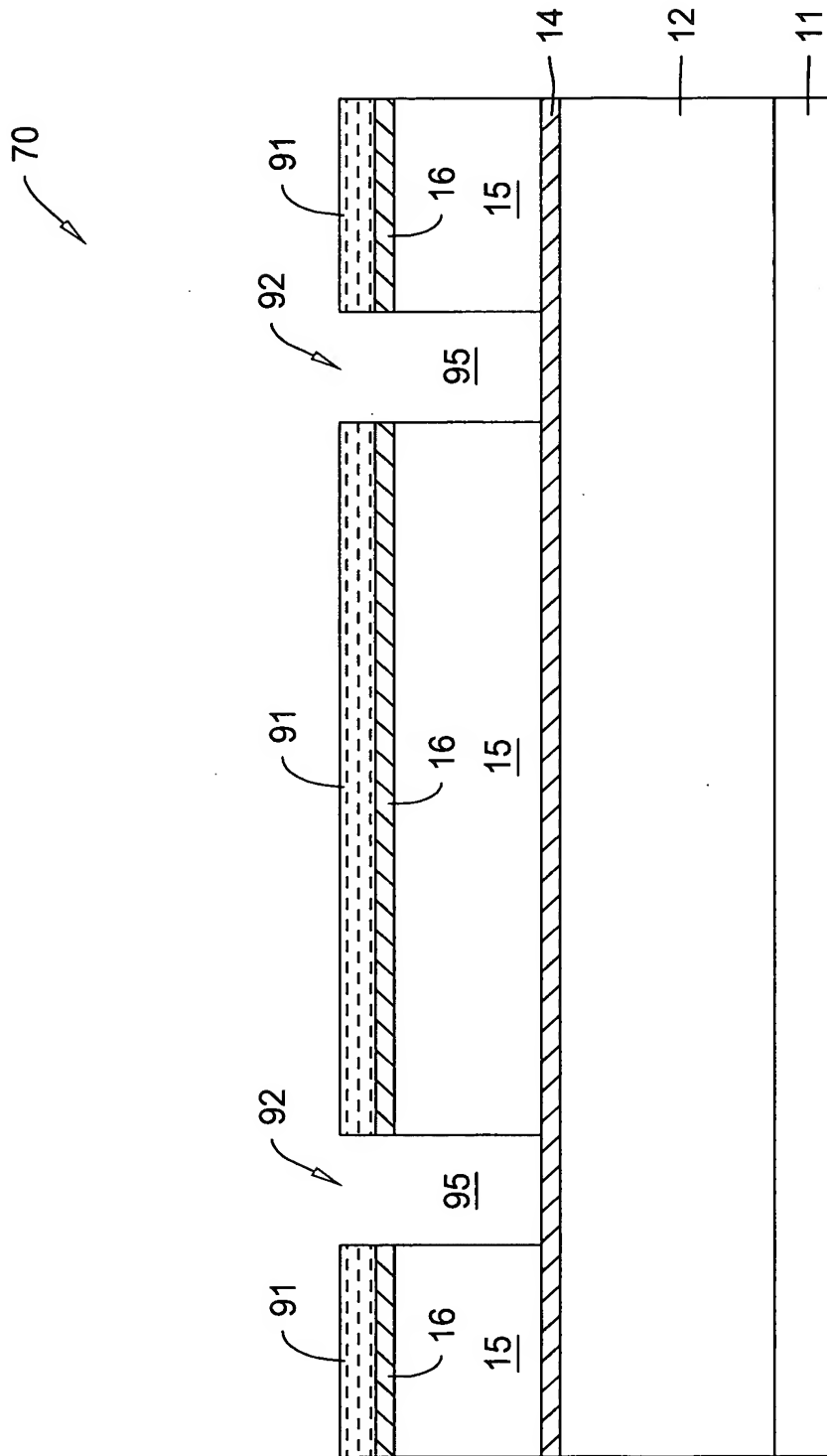


Figure 111

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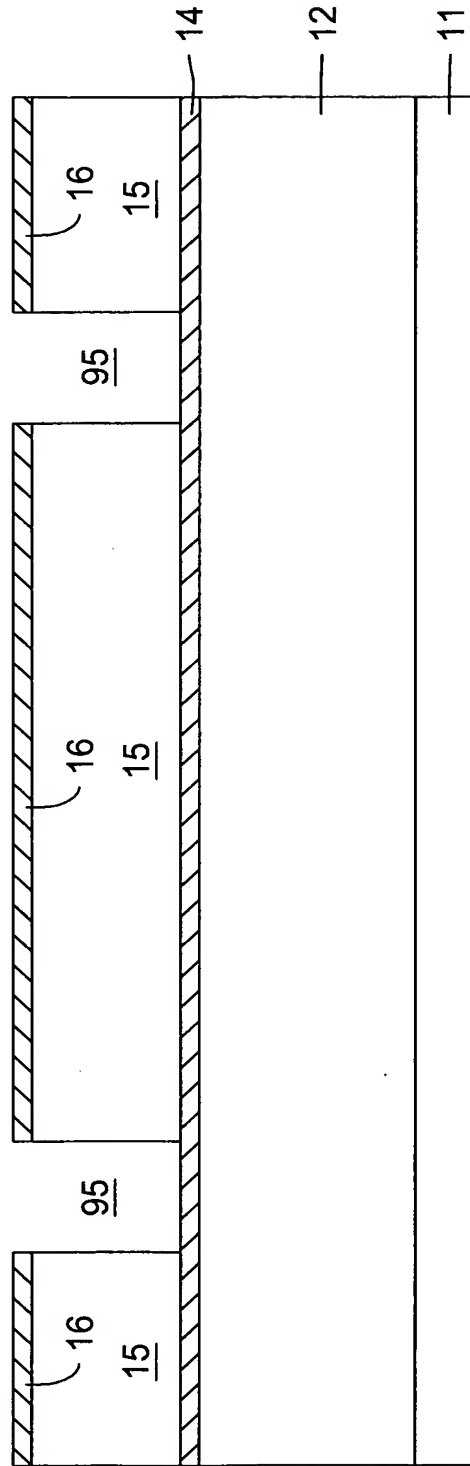


Figure 112

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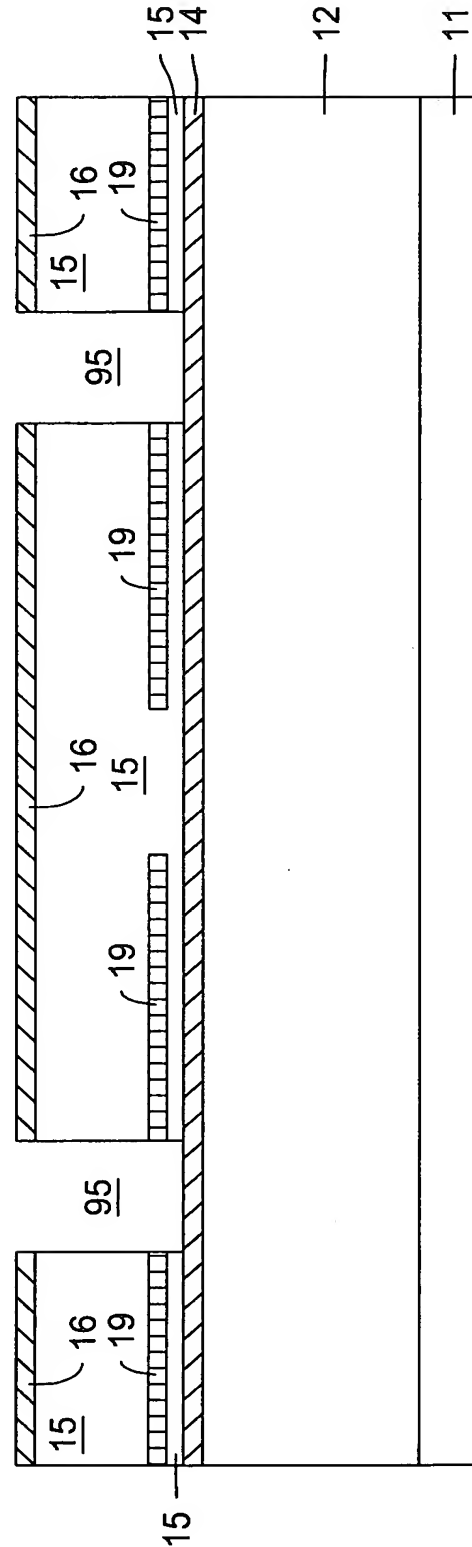


Figure 113

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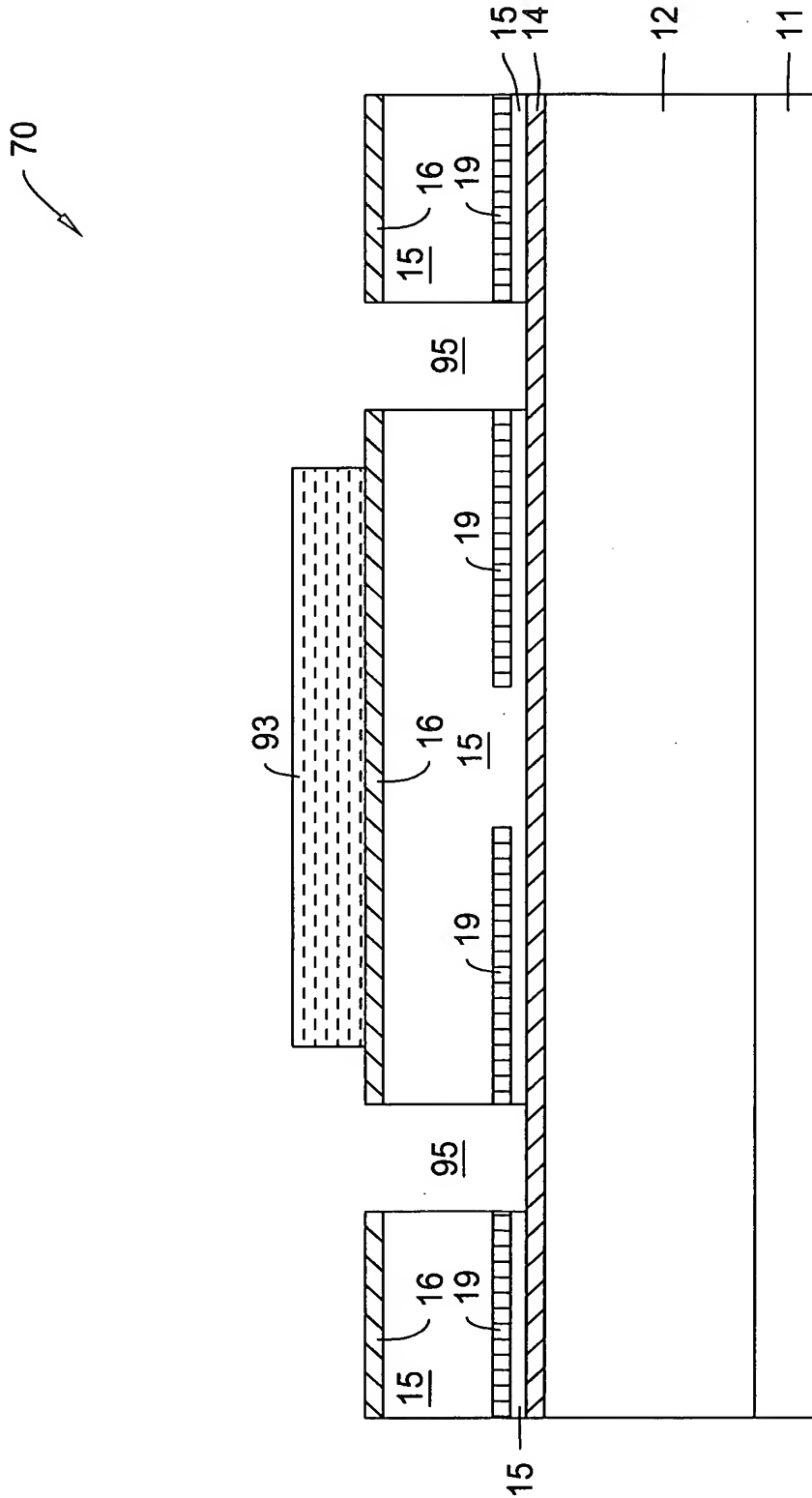


Figure 114

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70

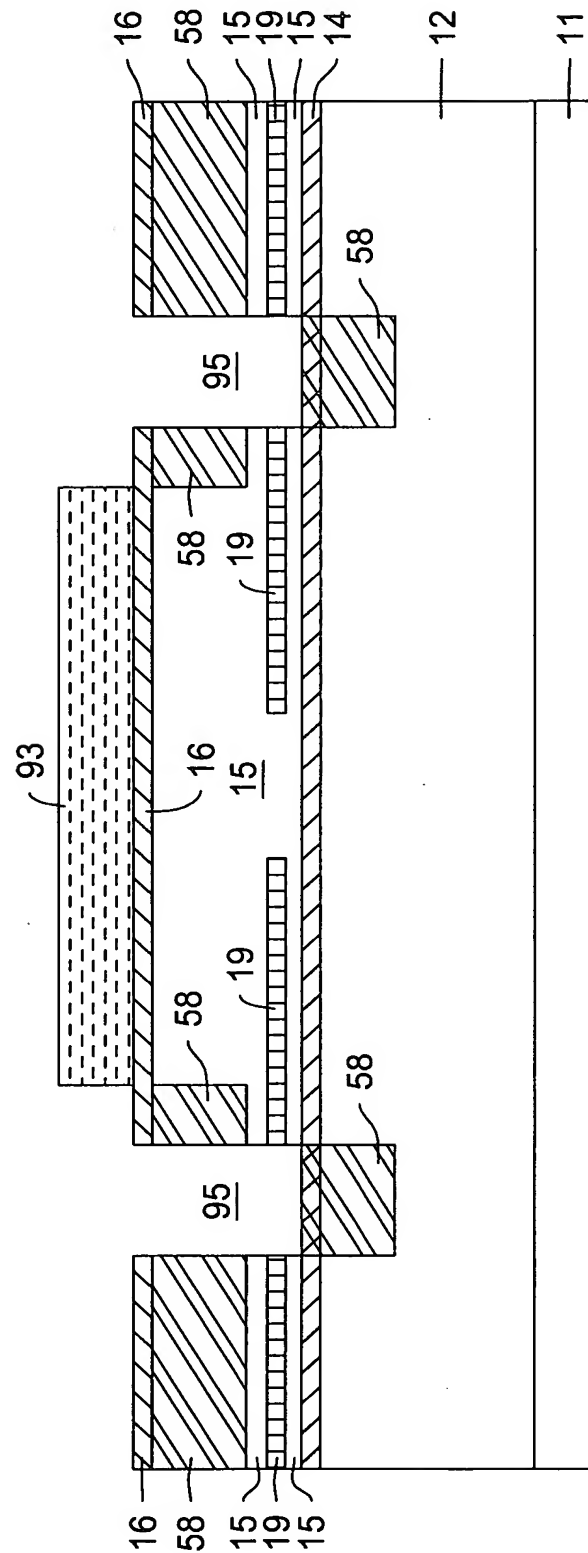
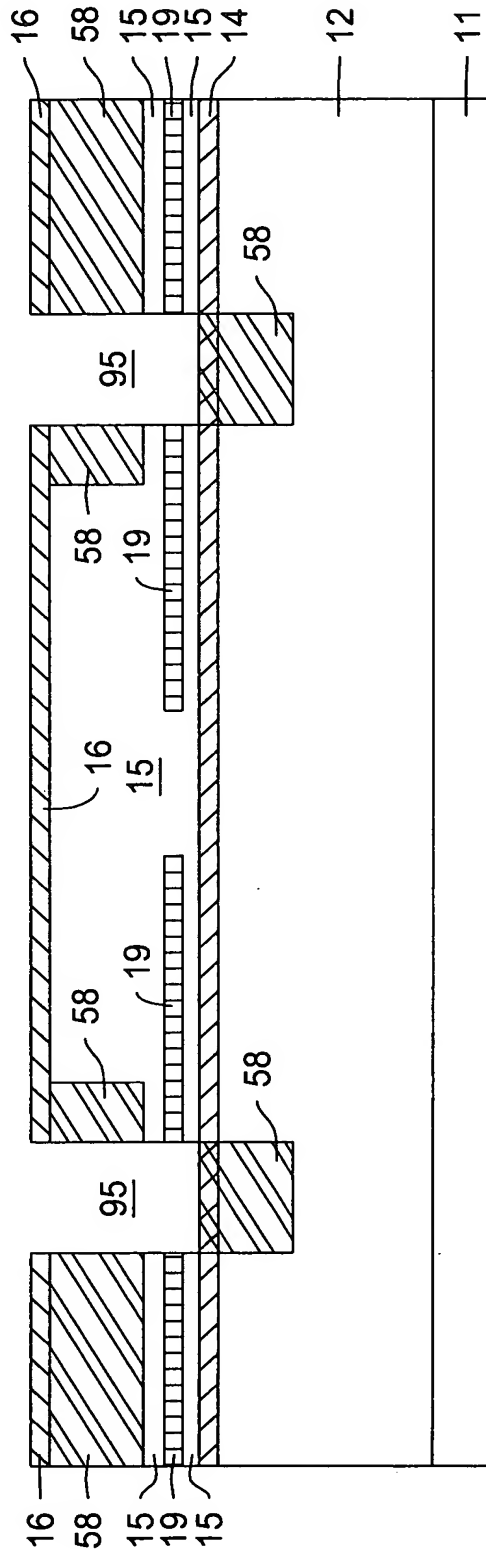


Figure 115





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70

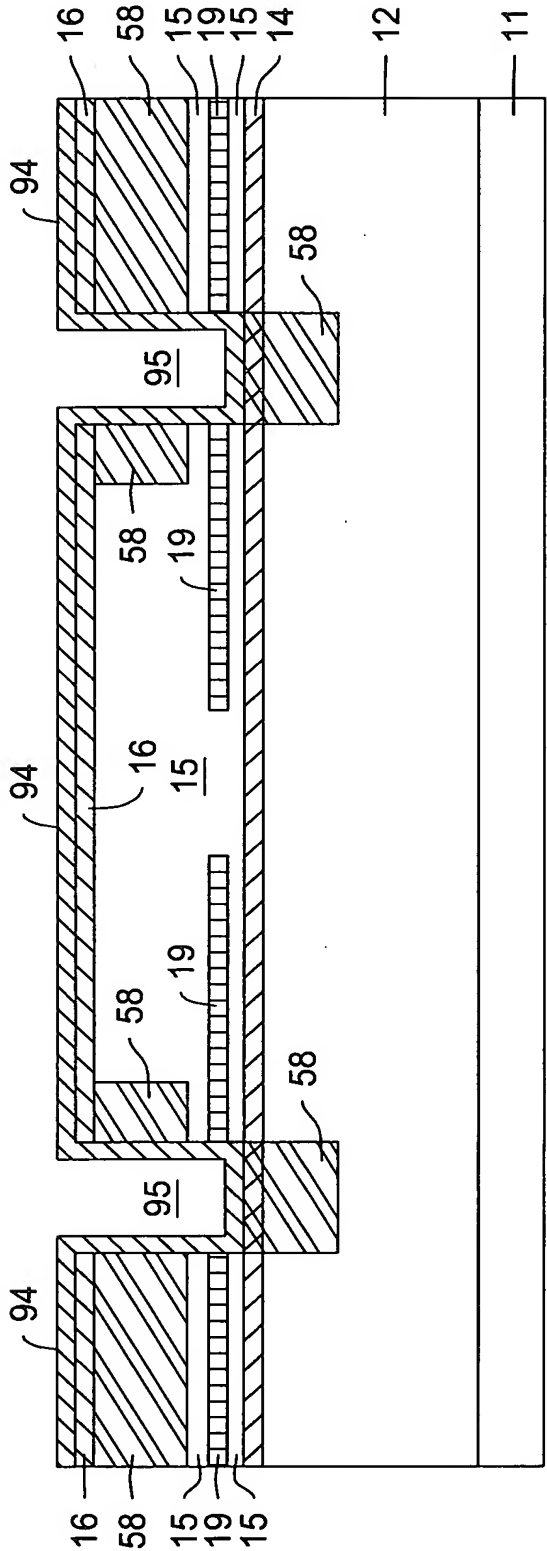
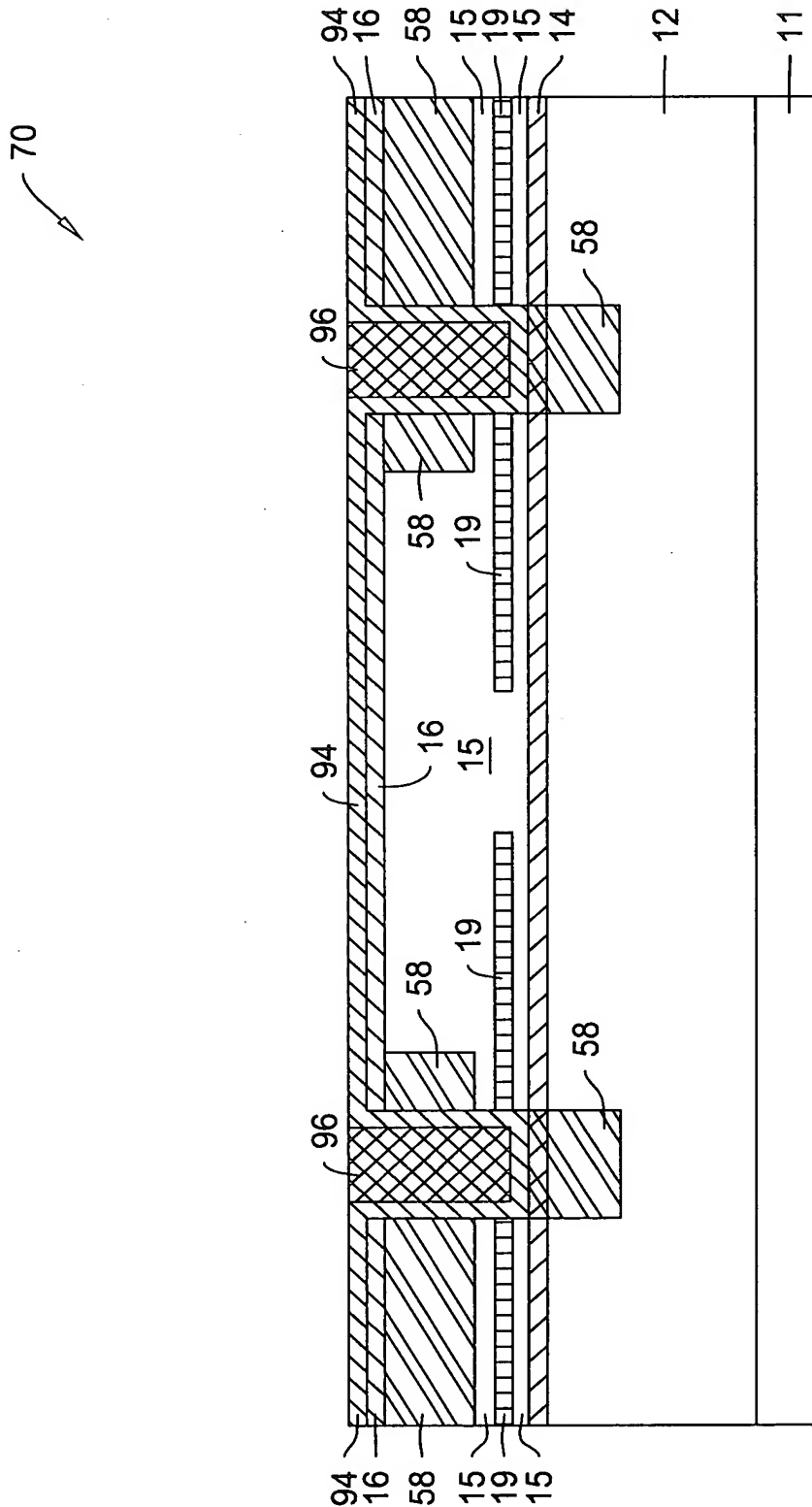


Figure 117





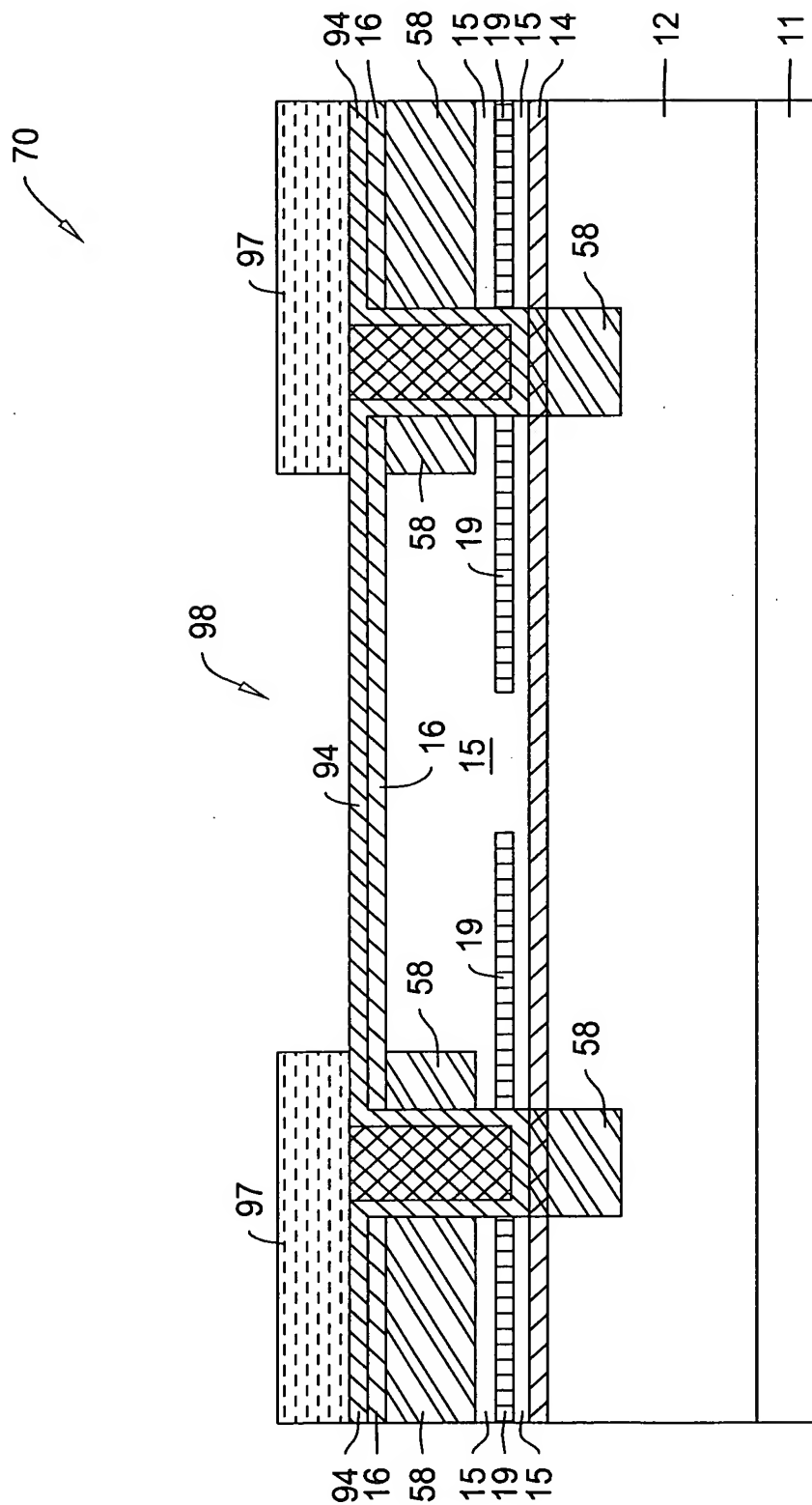


Figure 120

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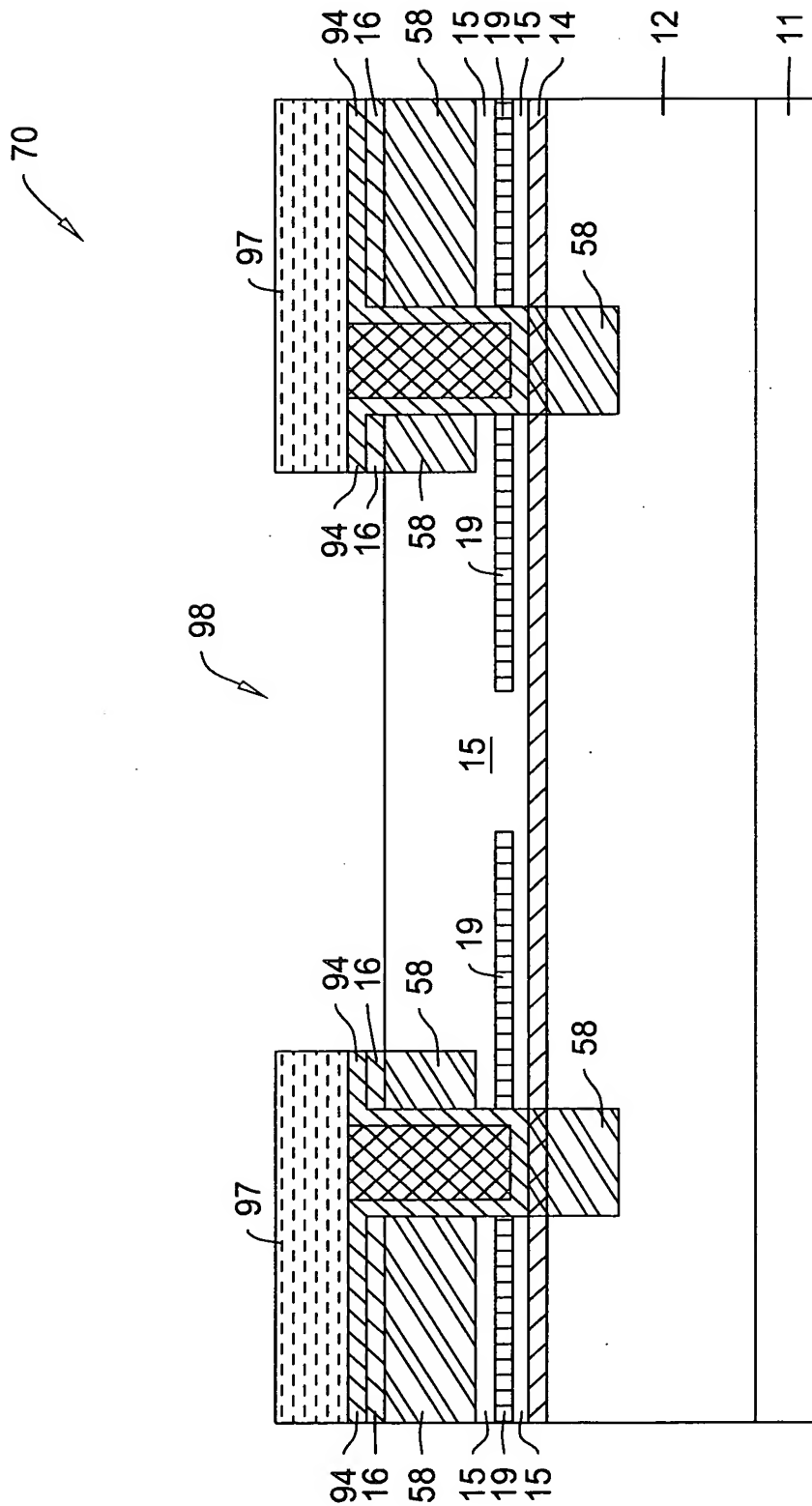


Figure 121

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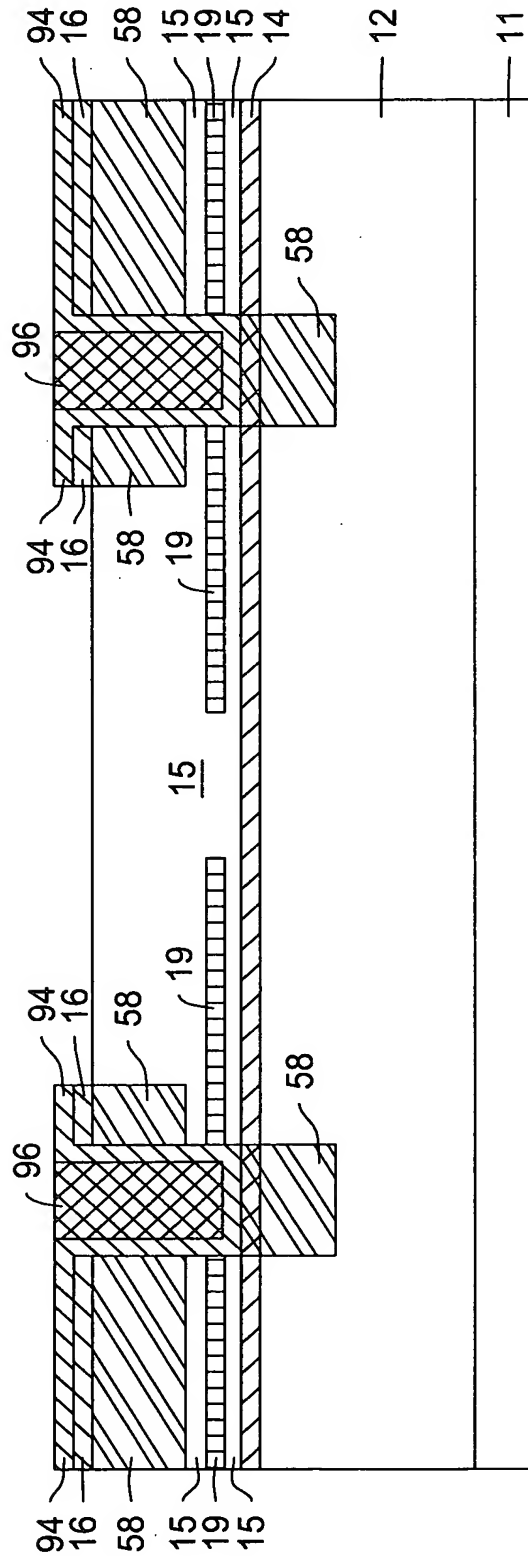


Figure 122

70 ↗

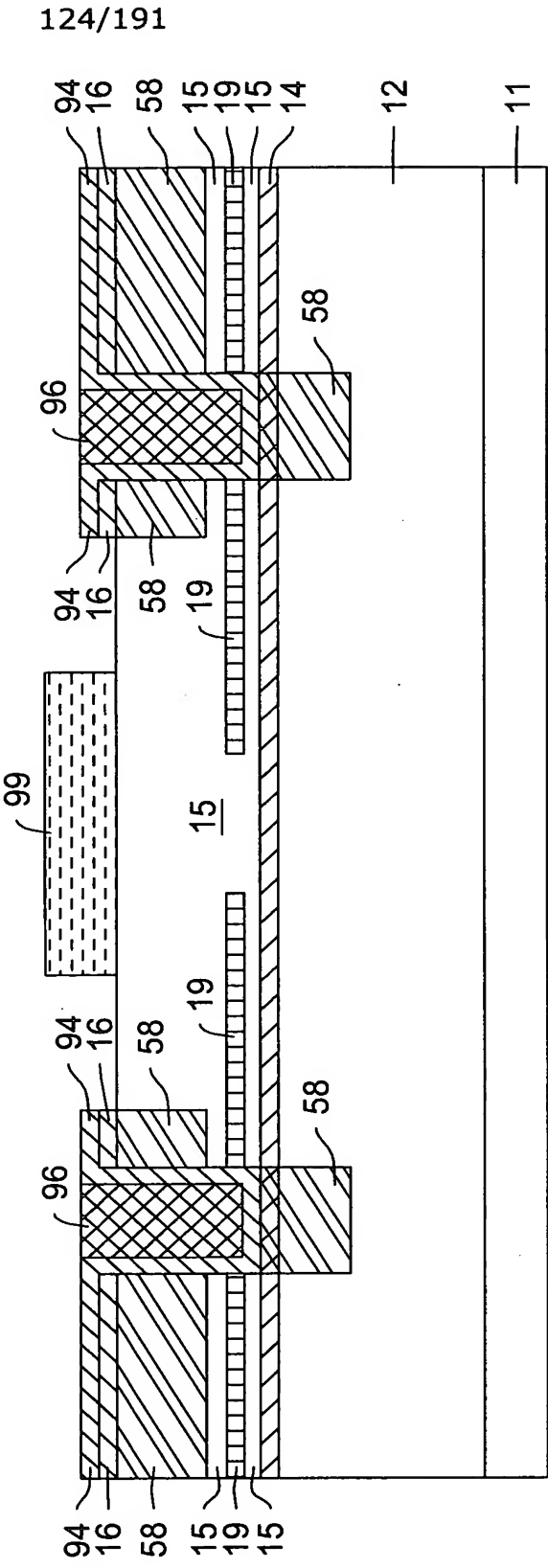
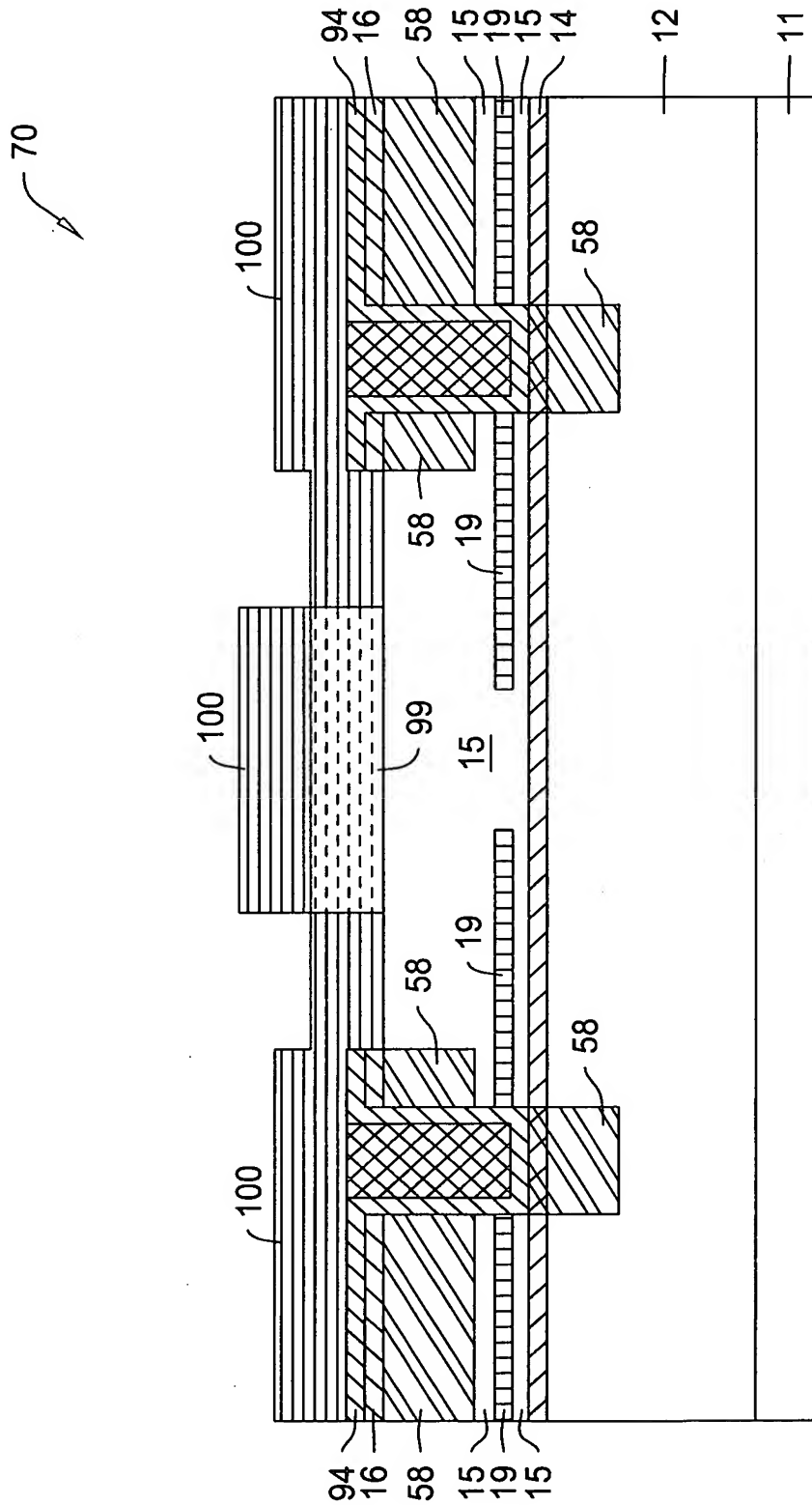
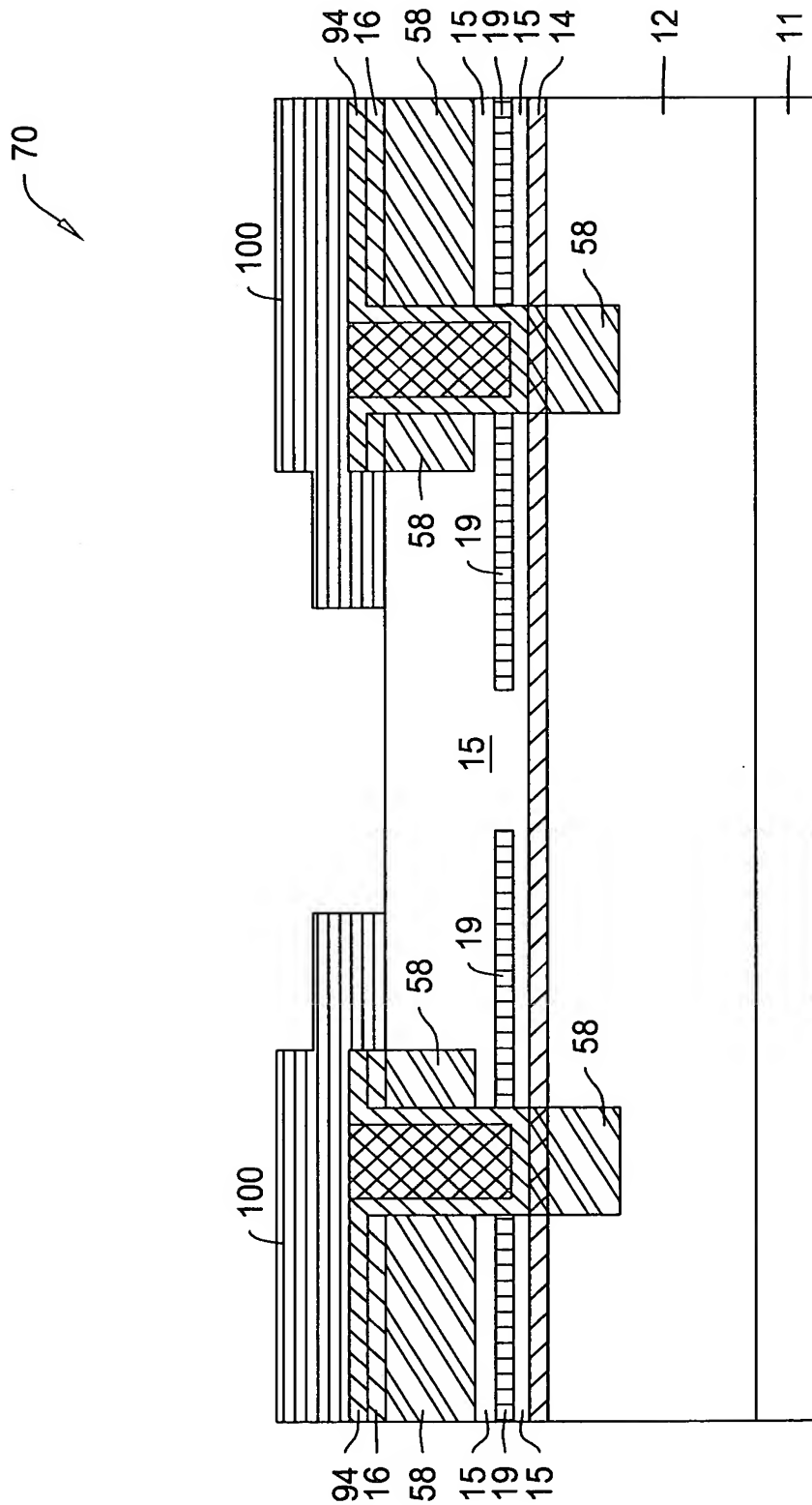


Figure 123







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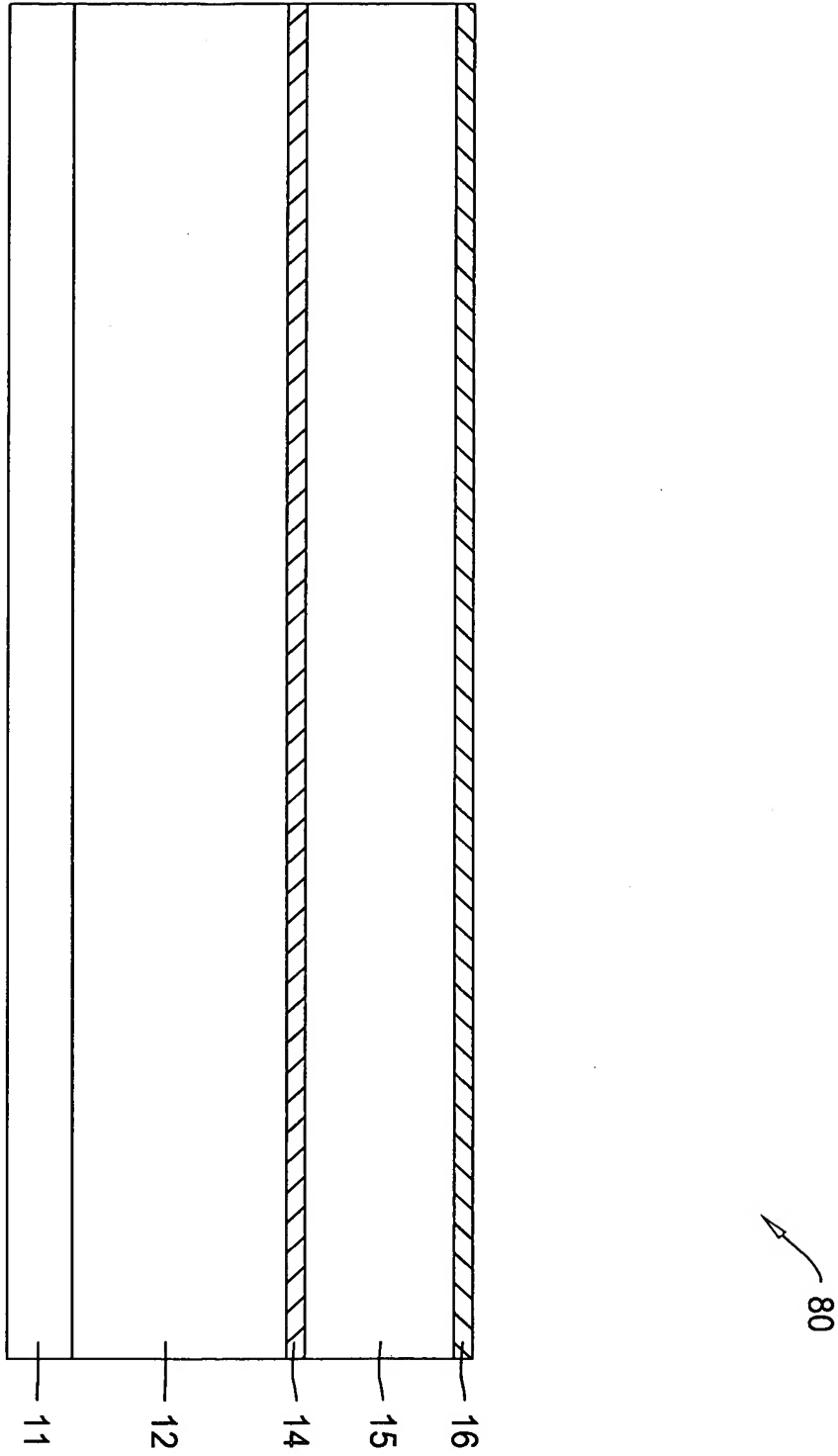


Figure 127

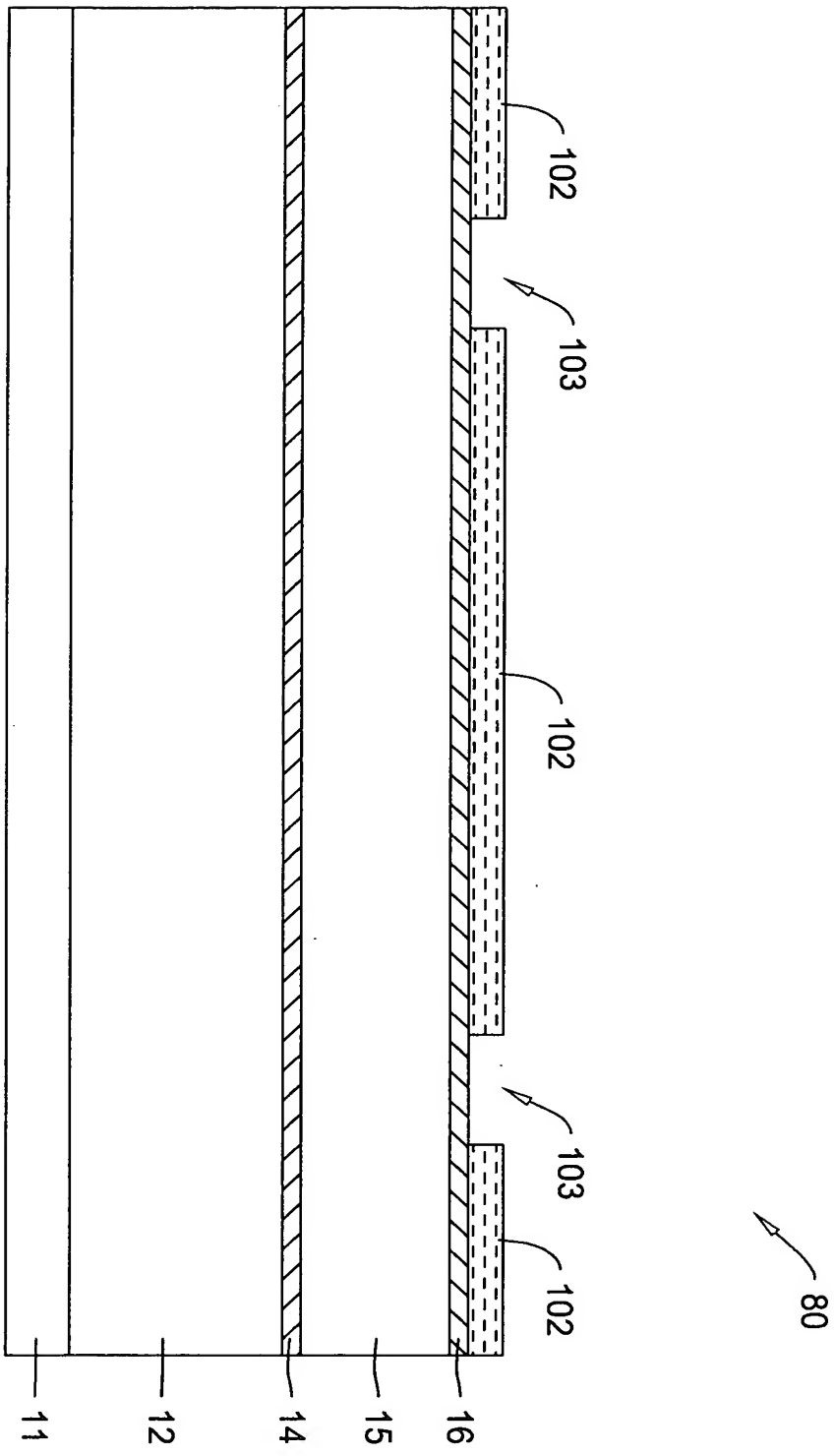


Figure 128

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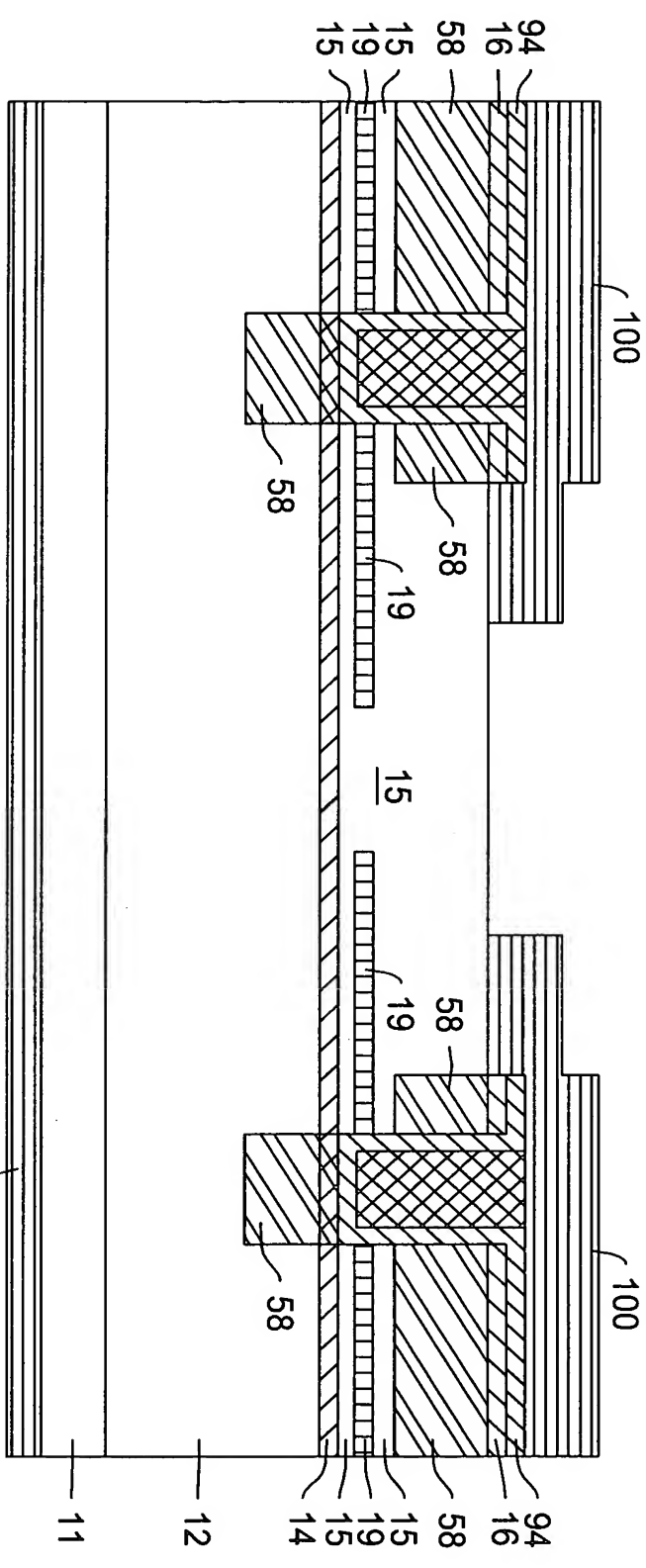


Figure 126

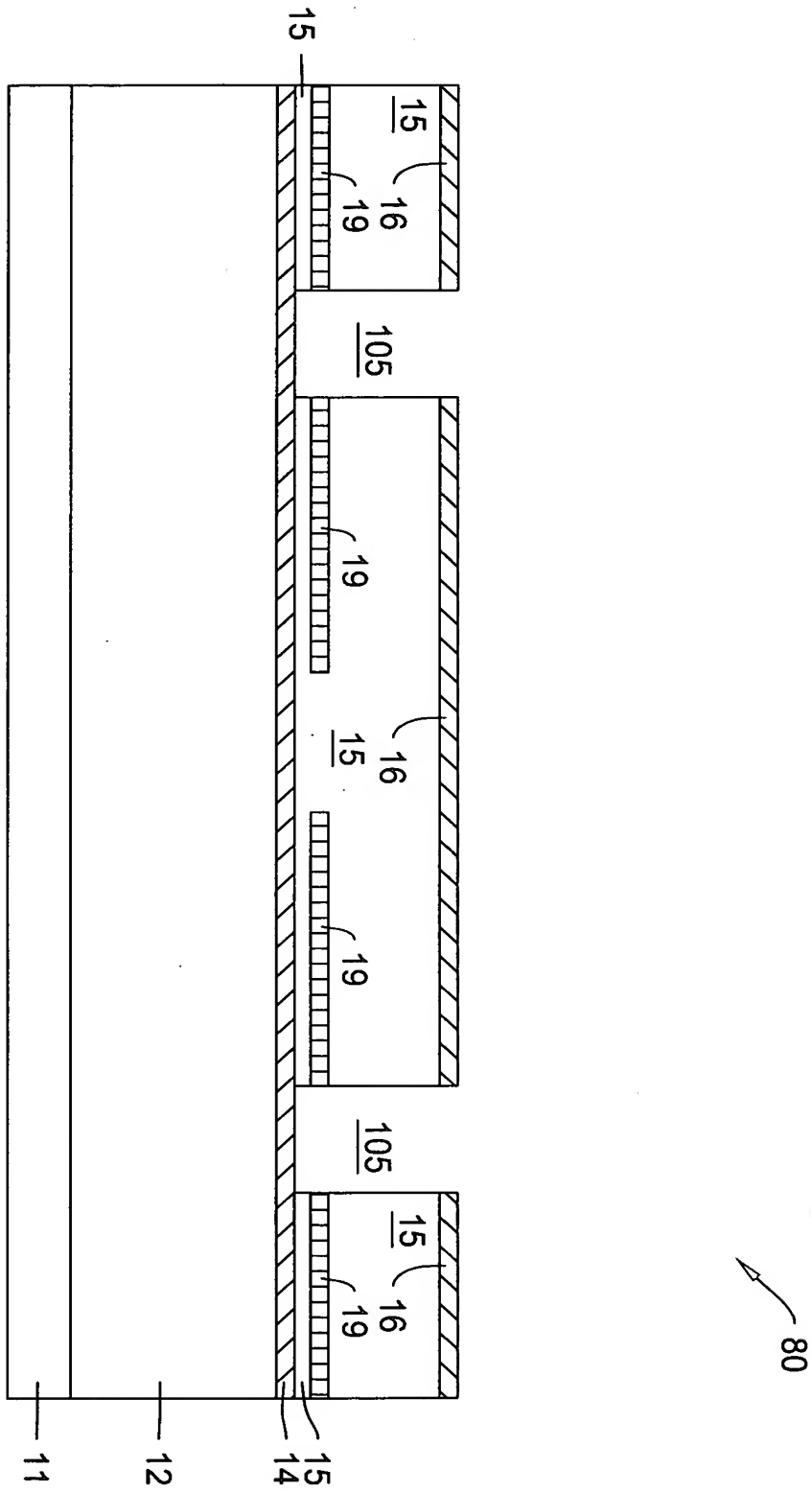


Figure 132

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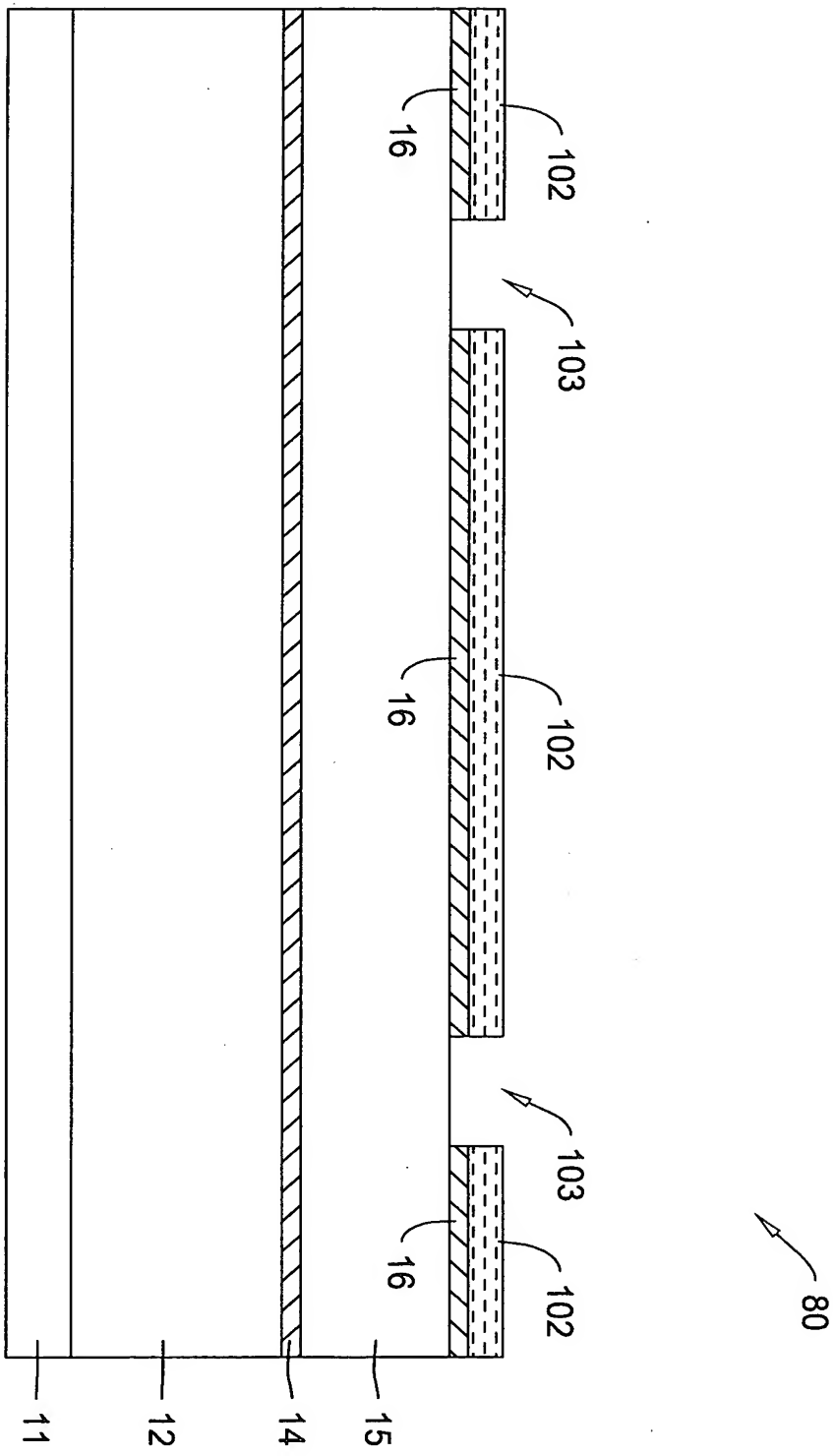


Figure 129

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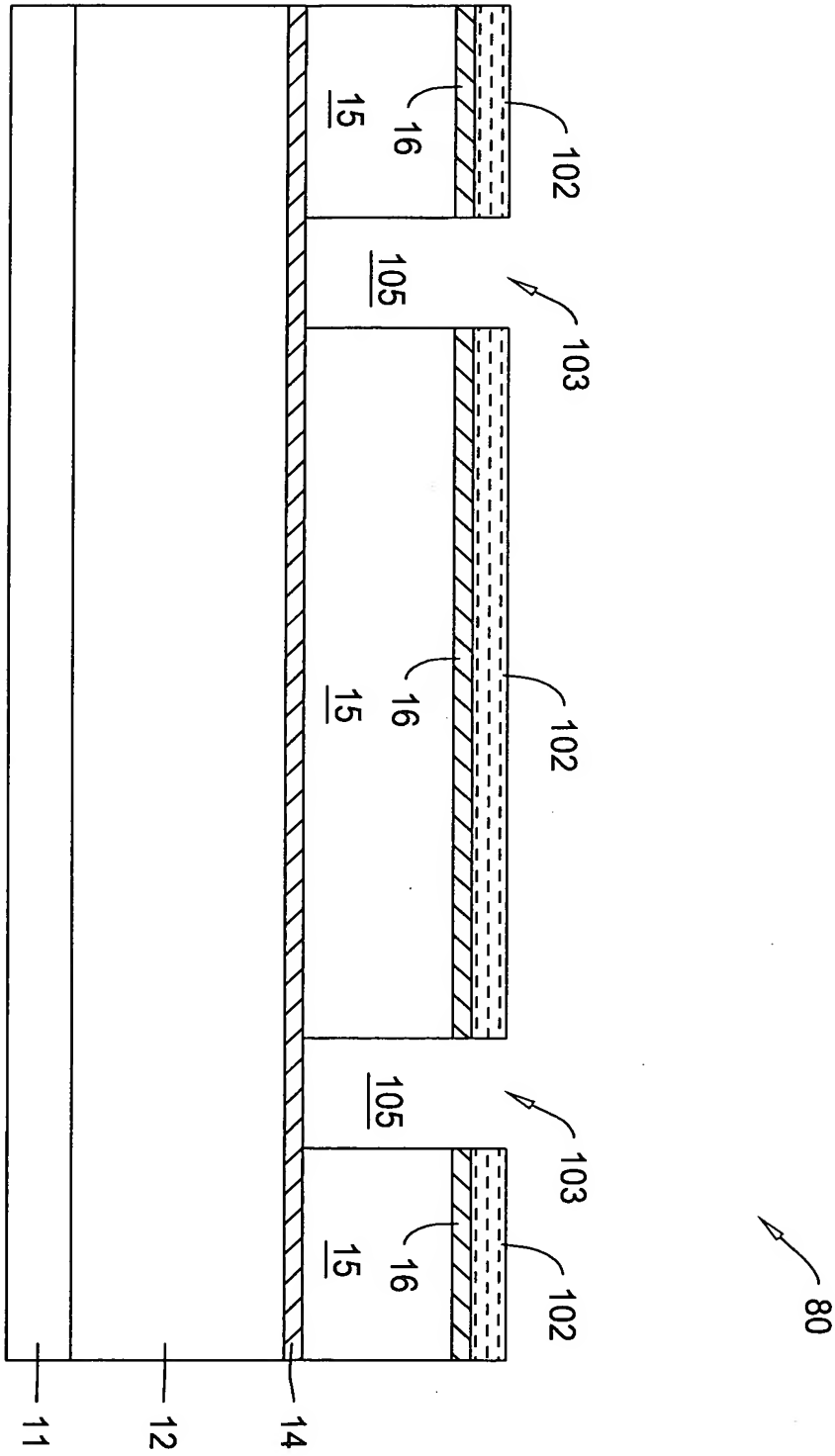


Figure 130



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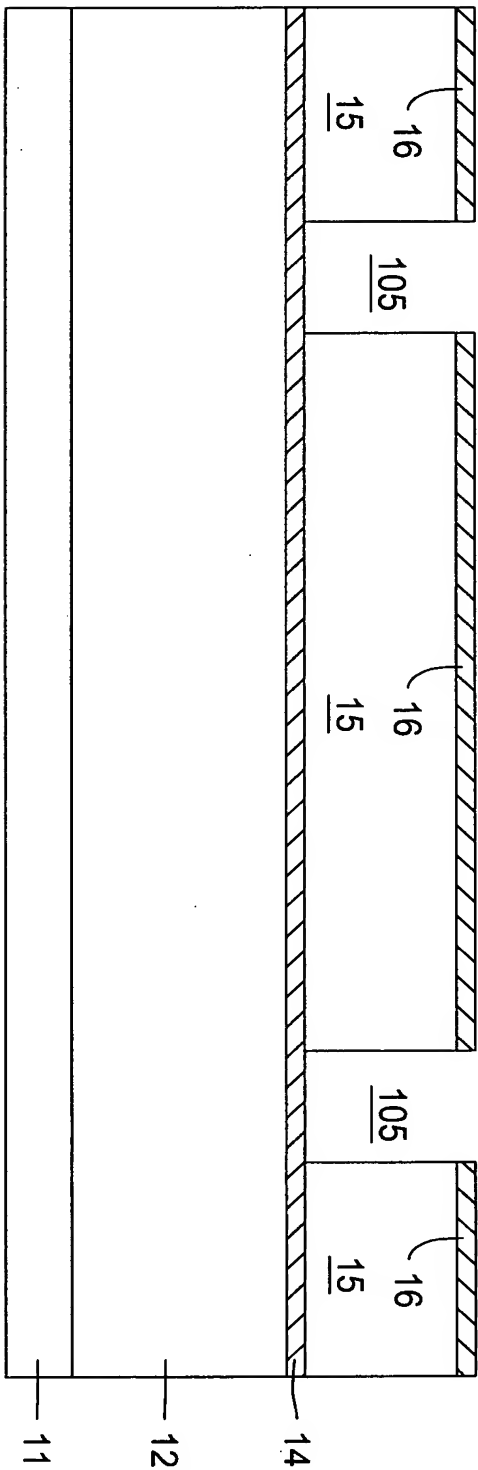


Figure 131

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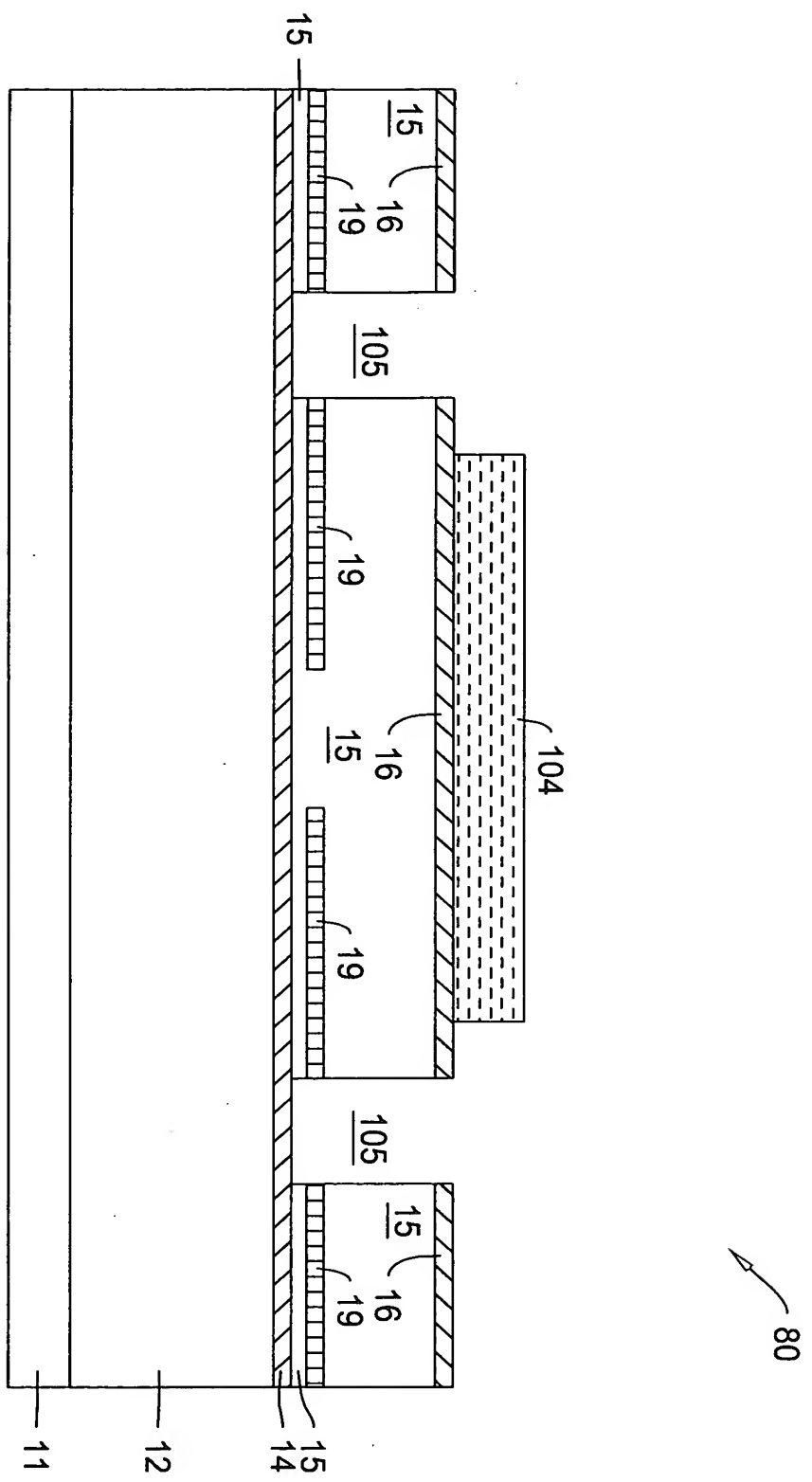


Figure 133

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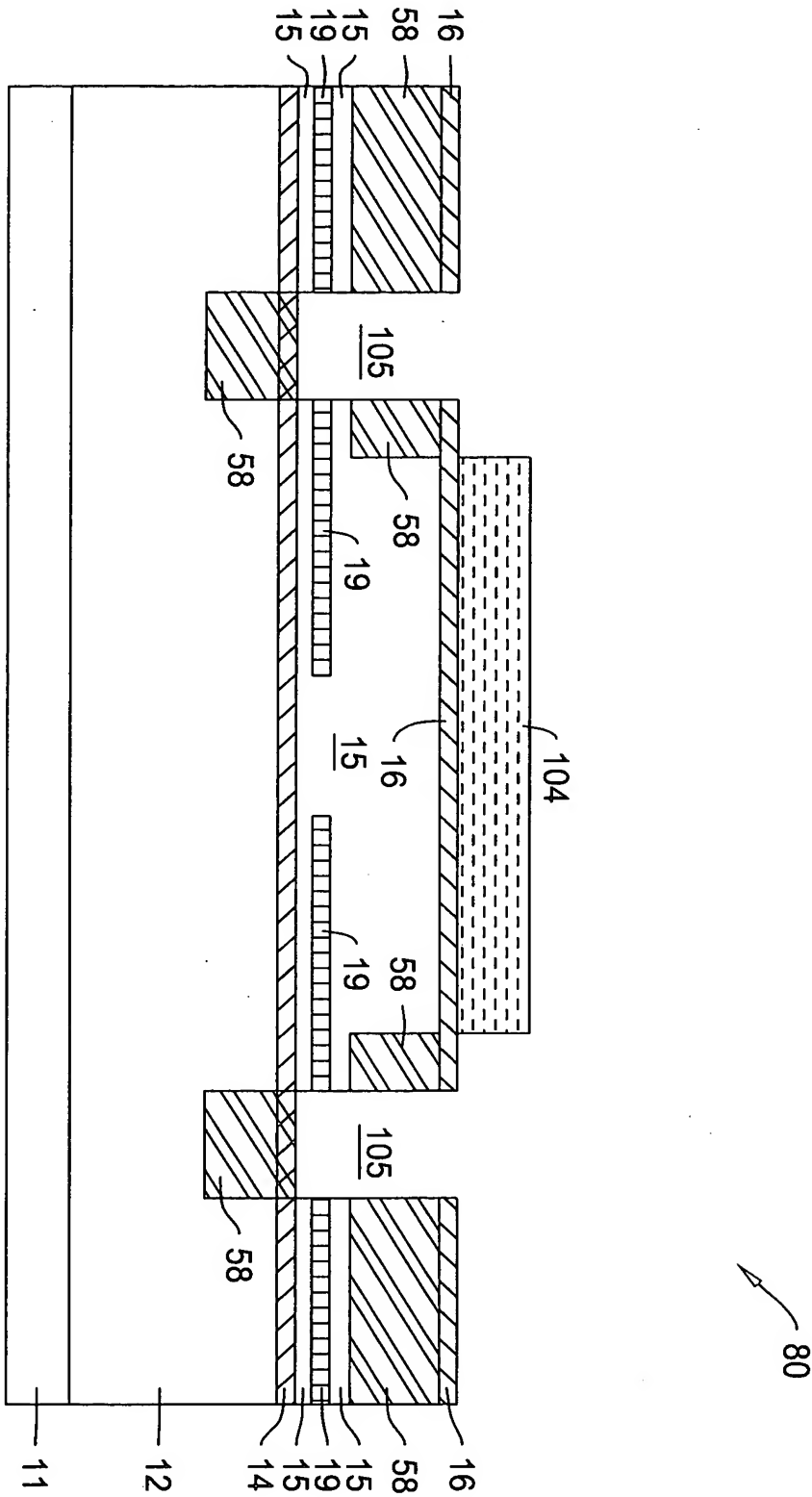
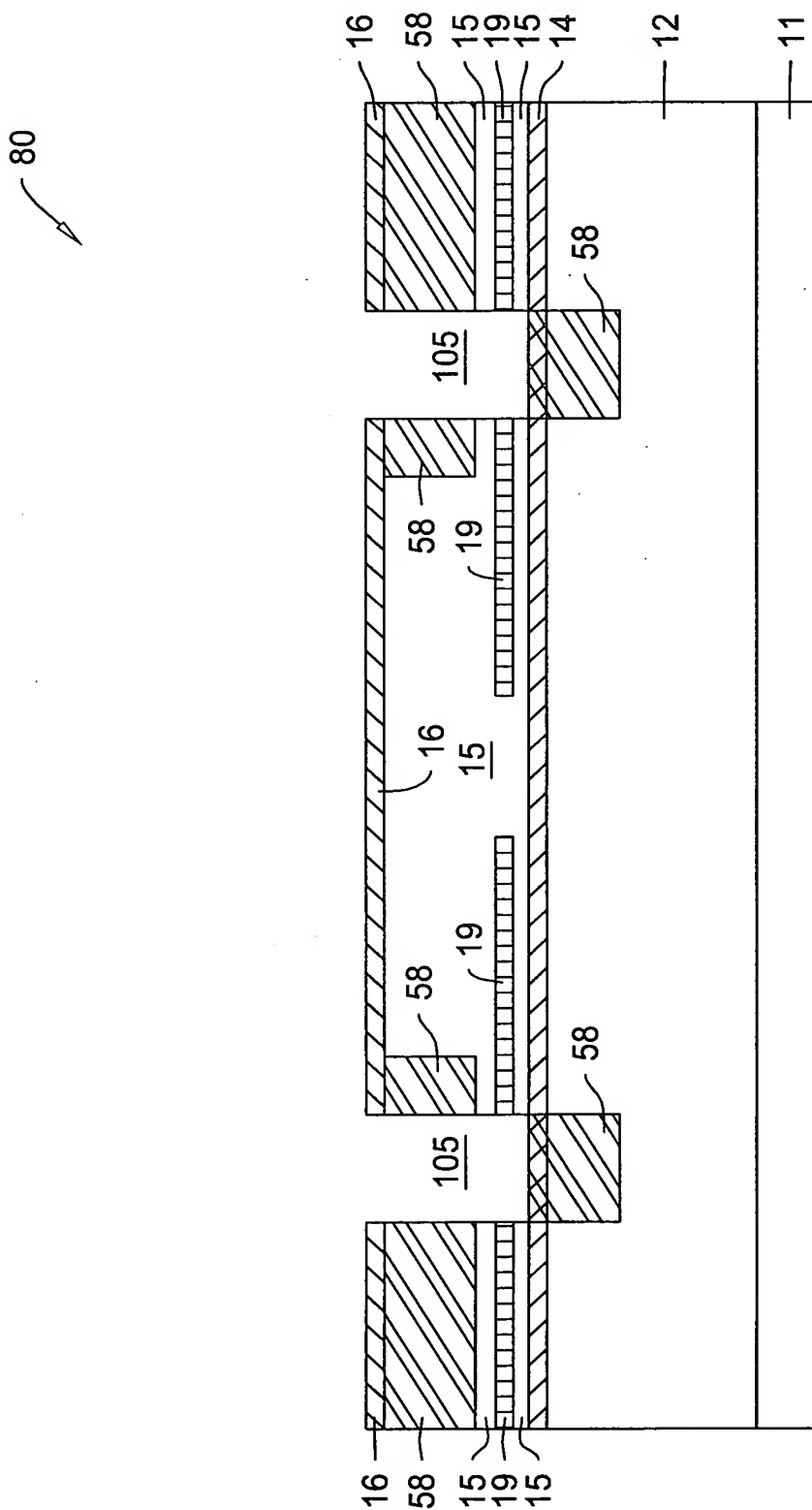


Figure 134



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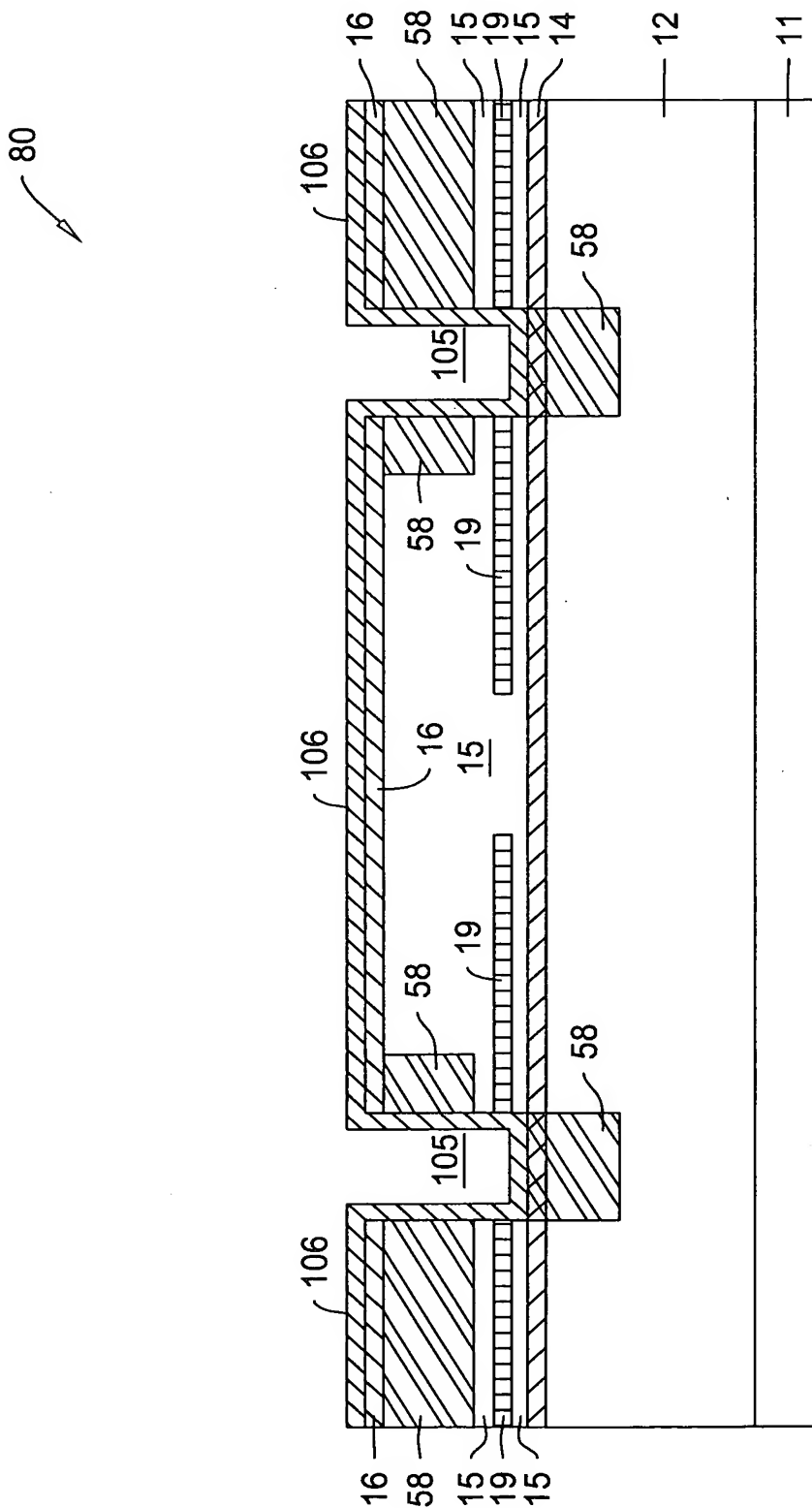


Figure 136

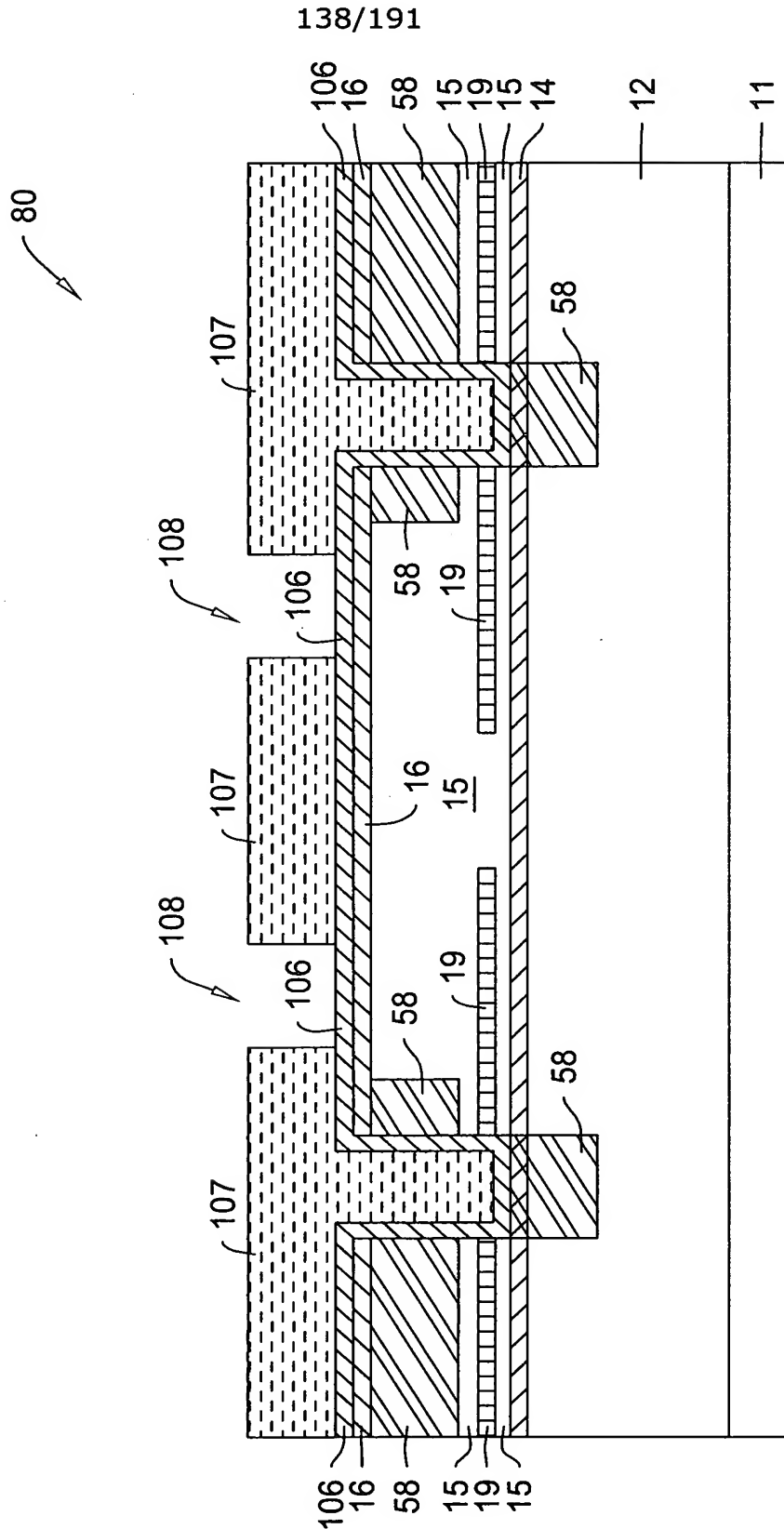


Figure 137

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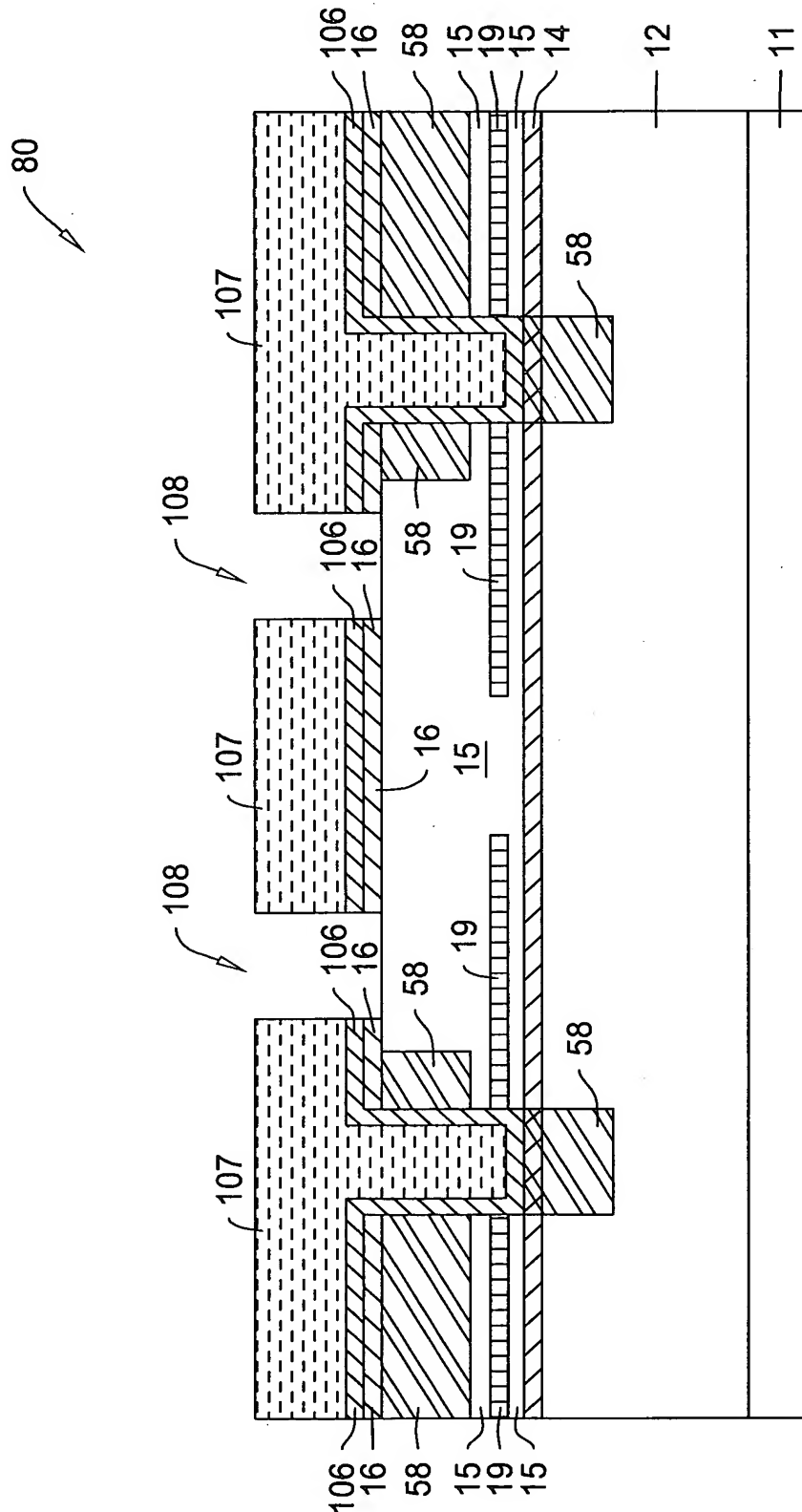


Figure 138

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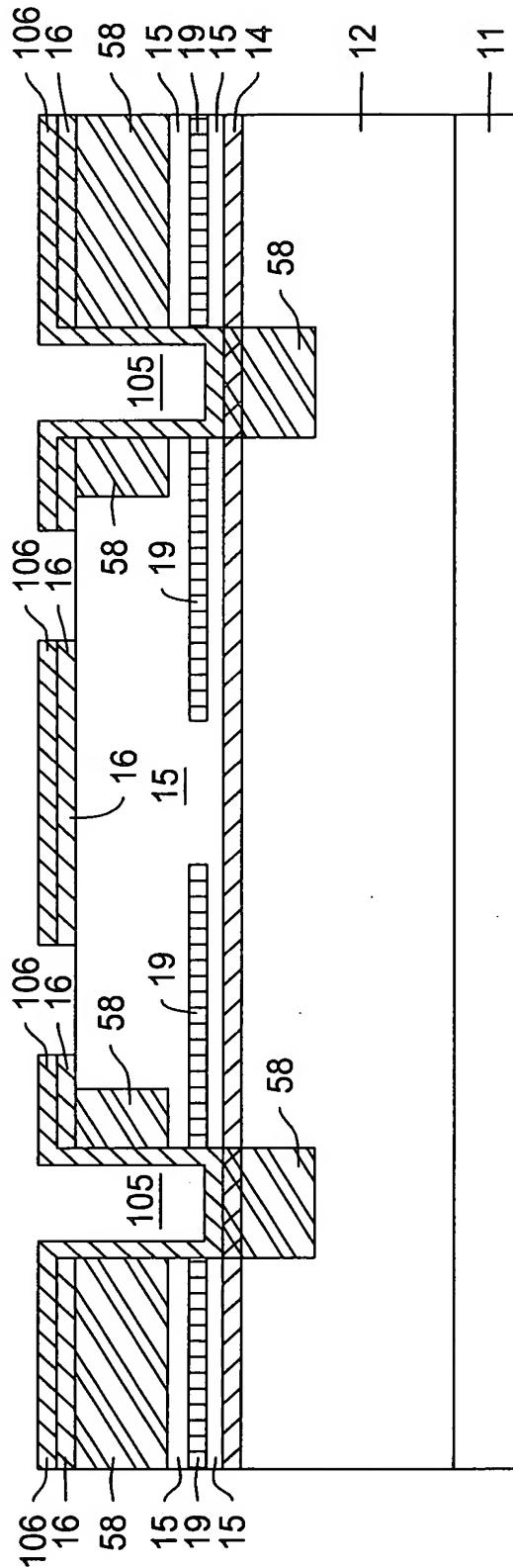
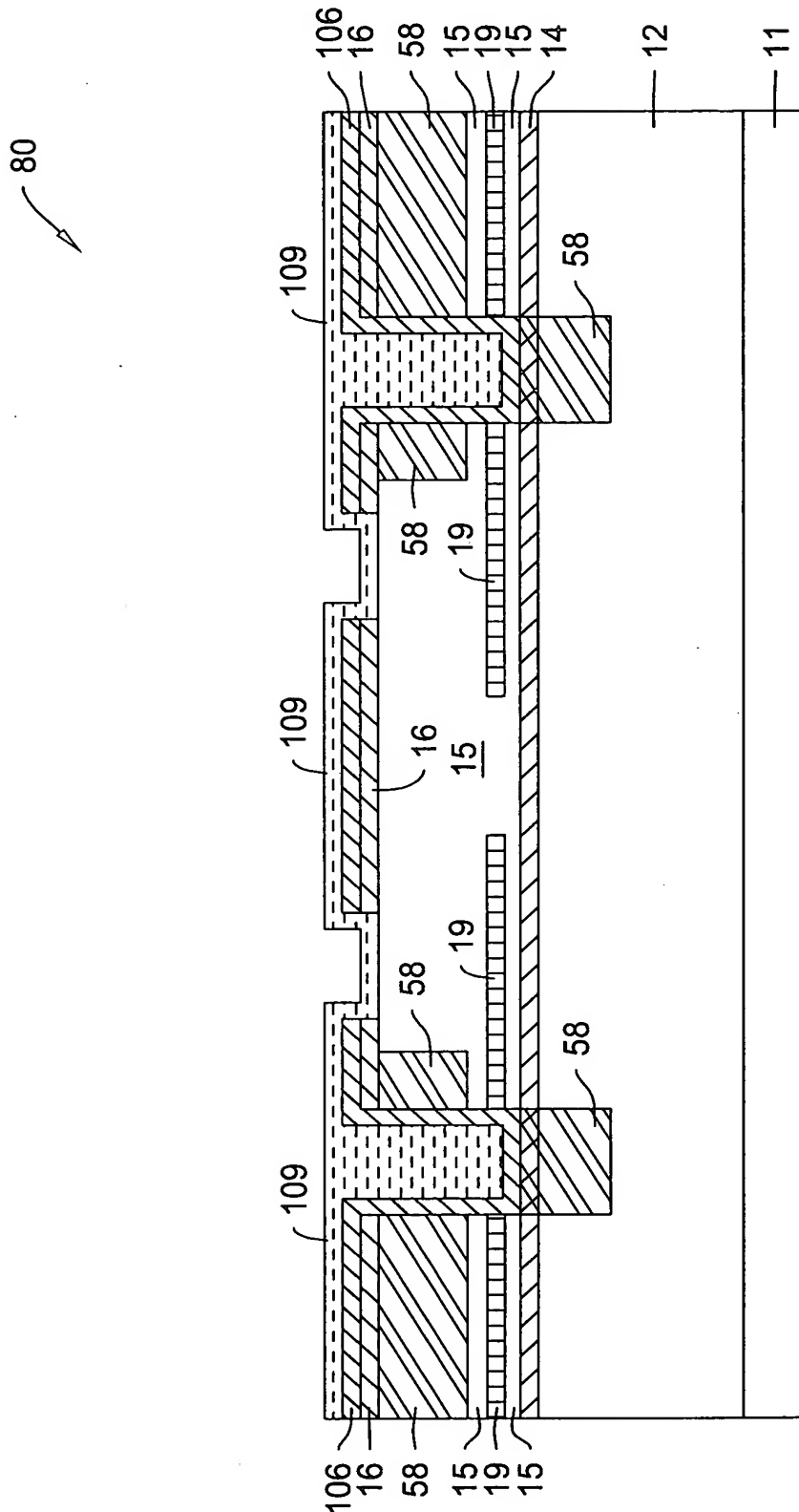
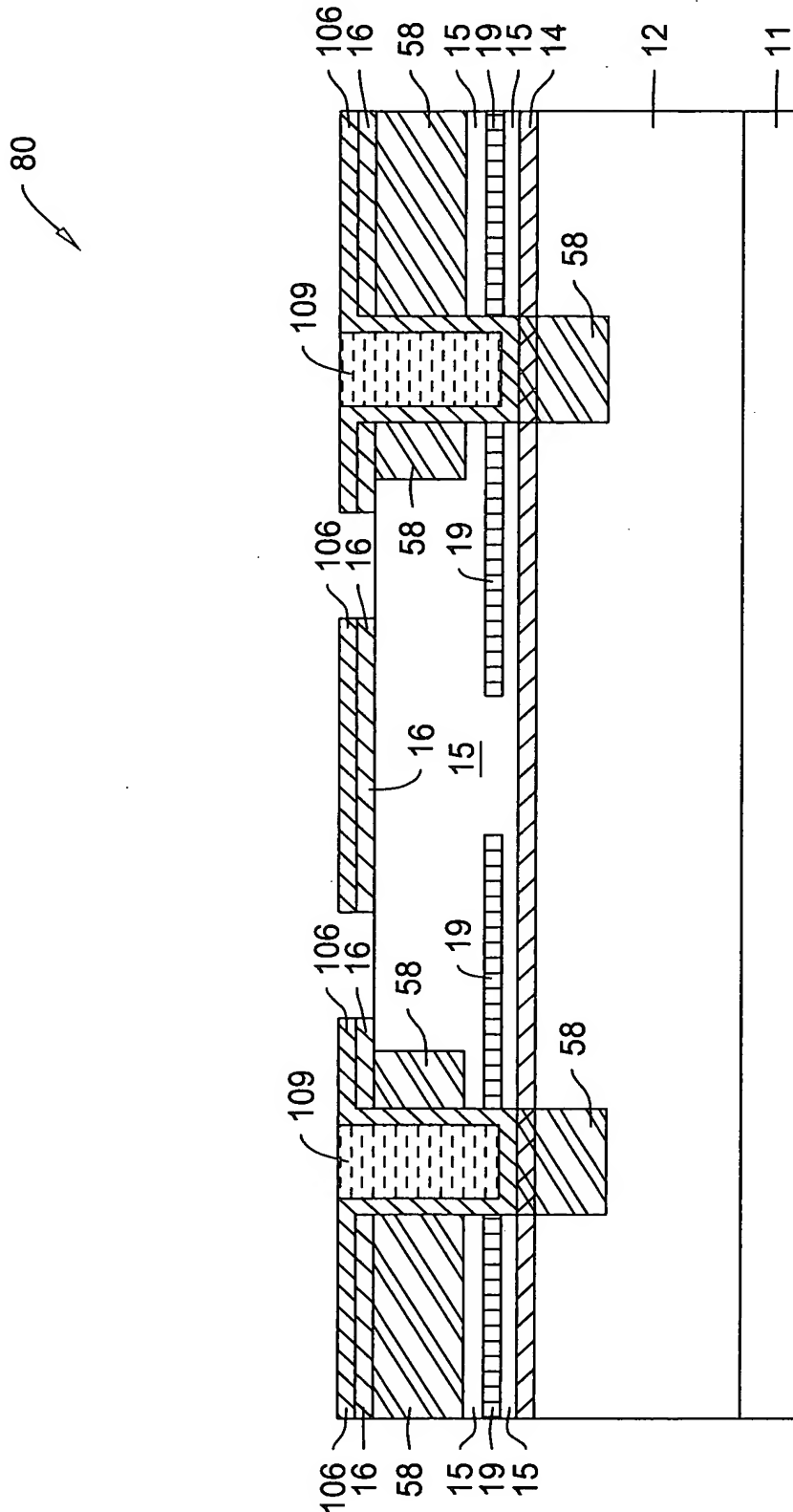


Figure 139









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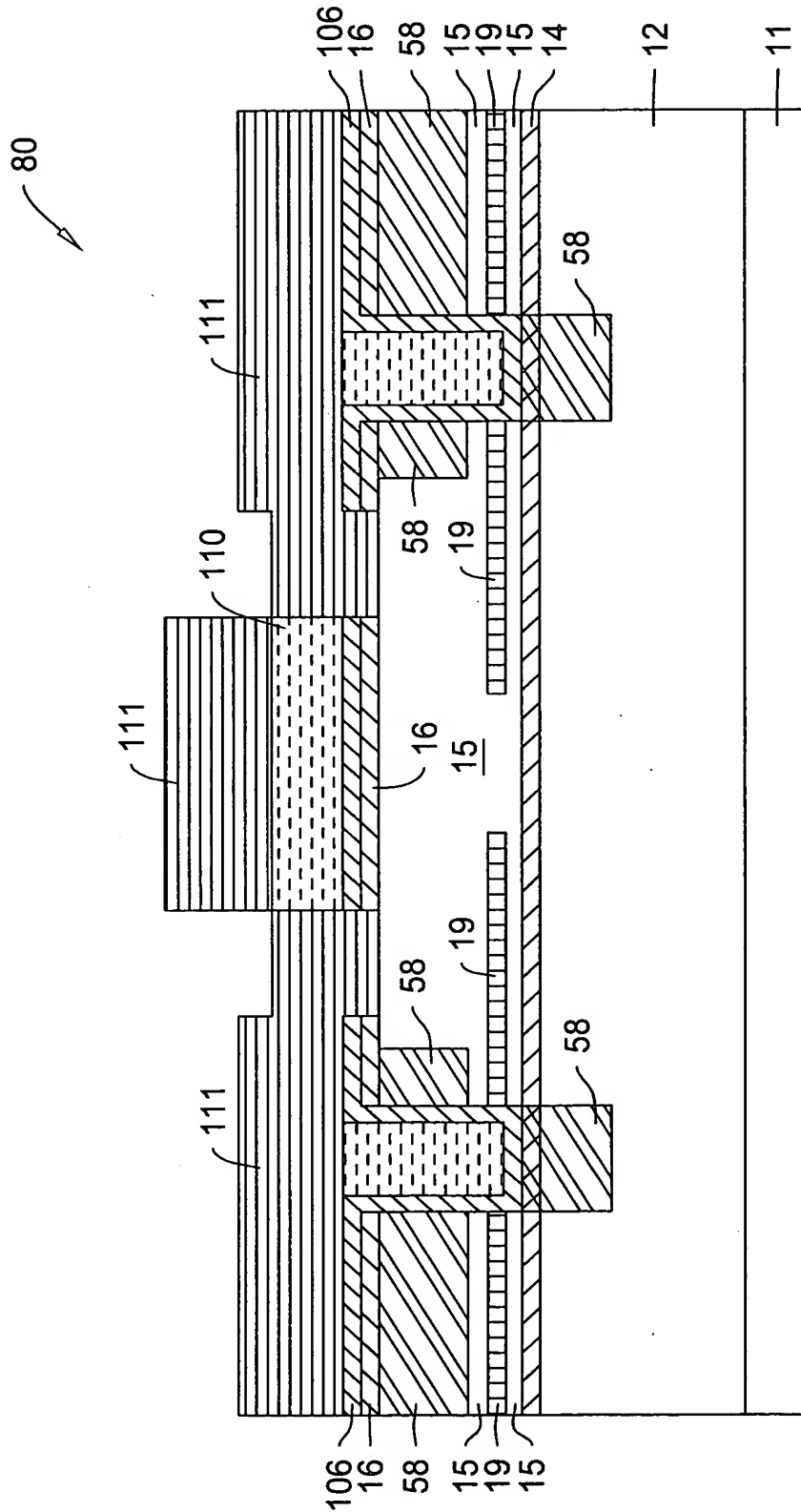


Figure 143



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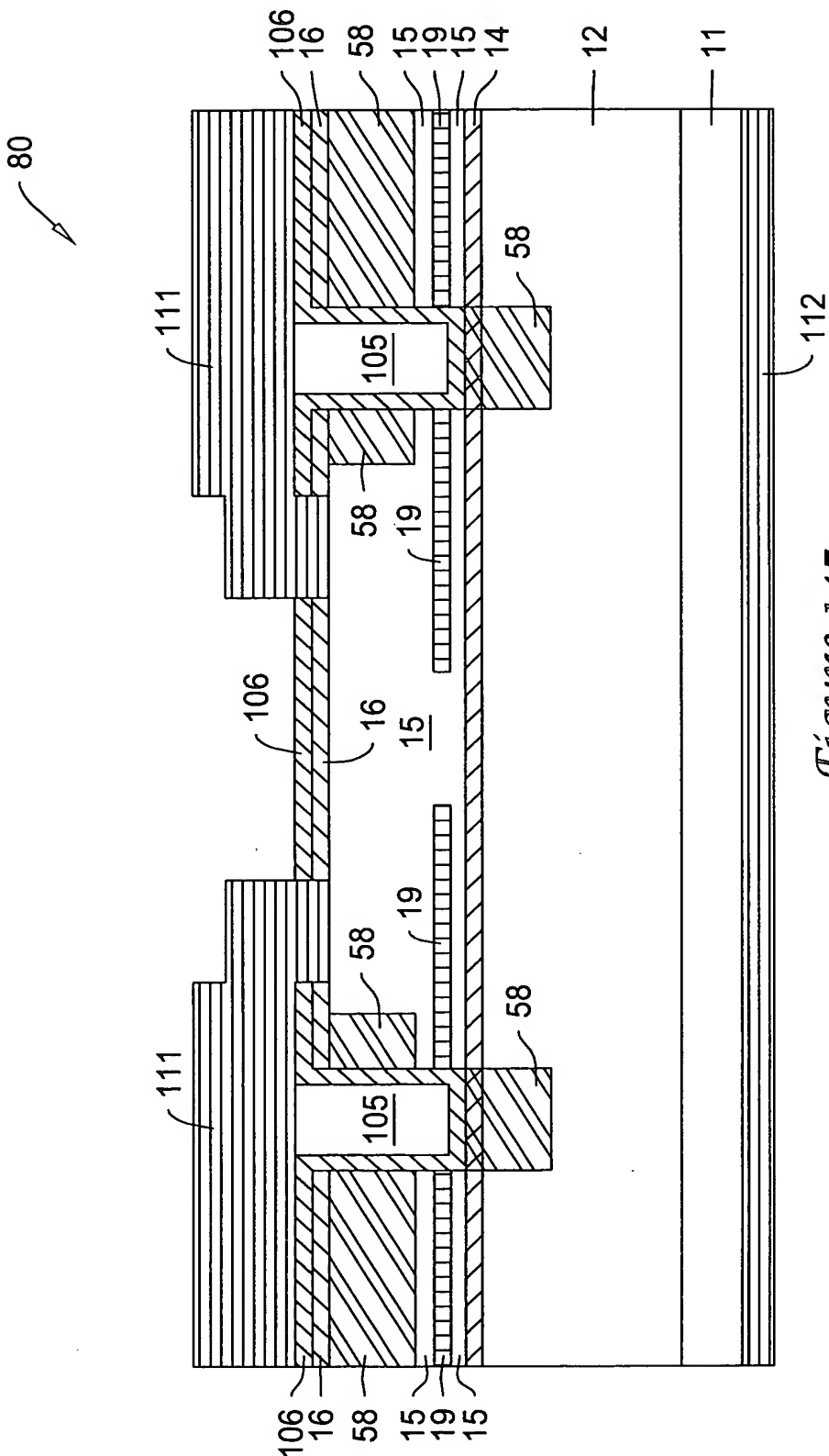


Figure 145

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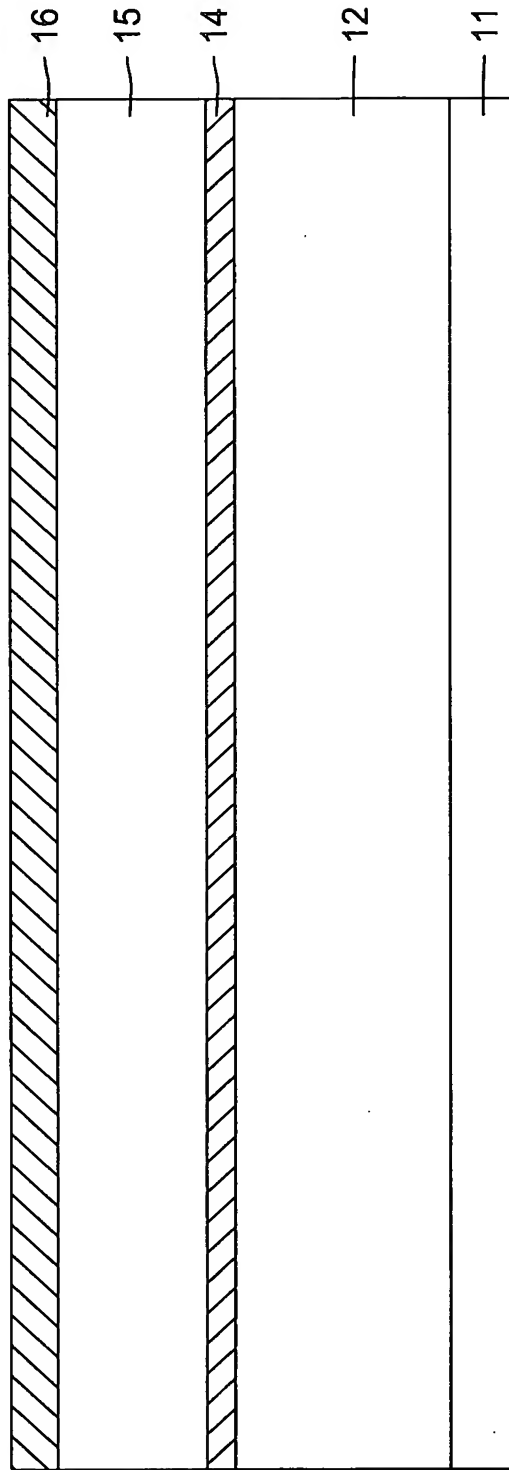


Figure 146

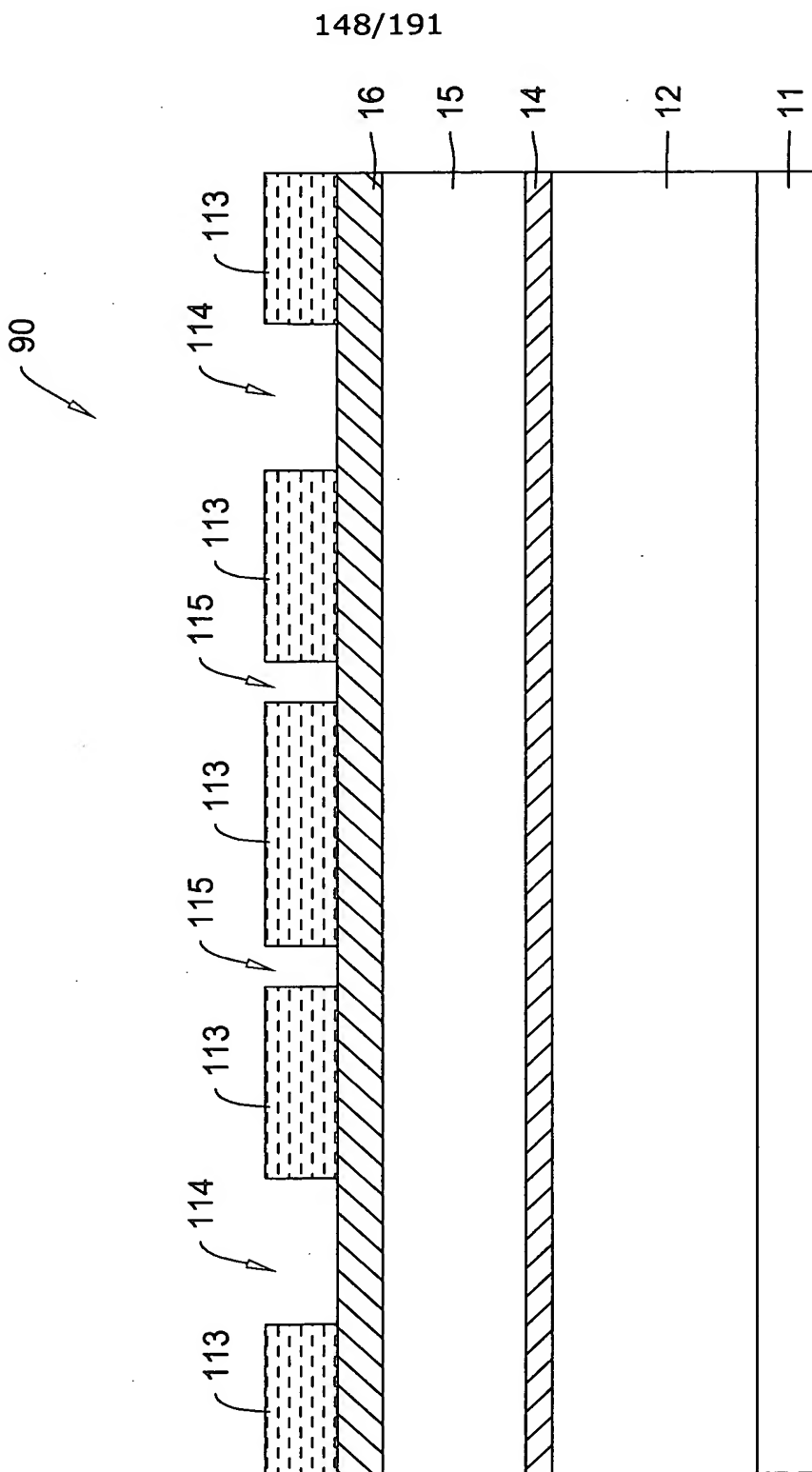


Figure 147



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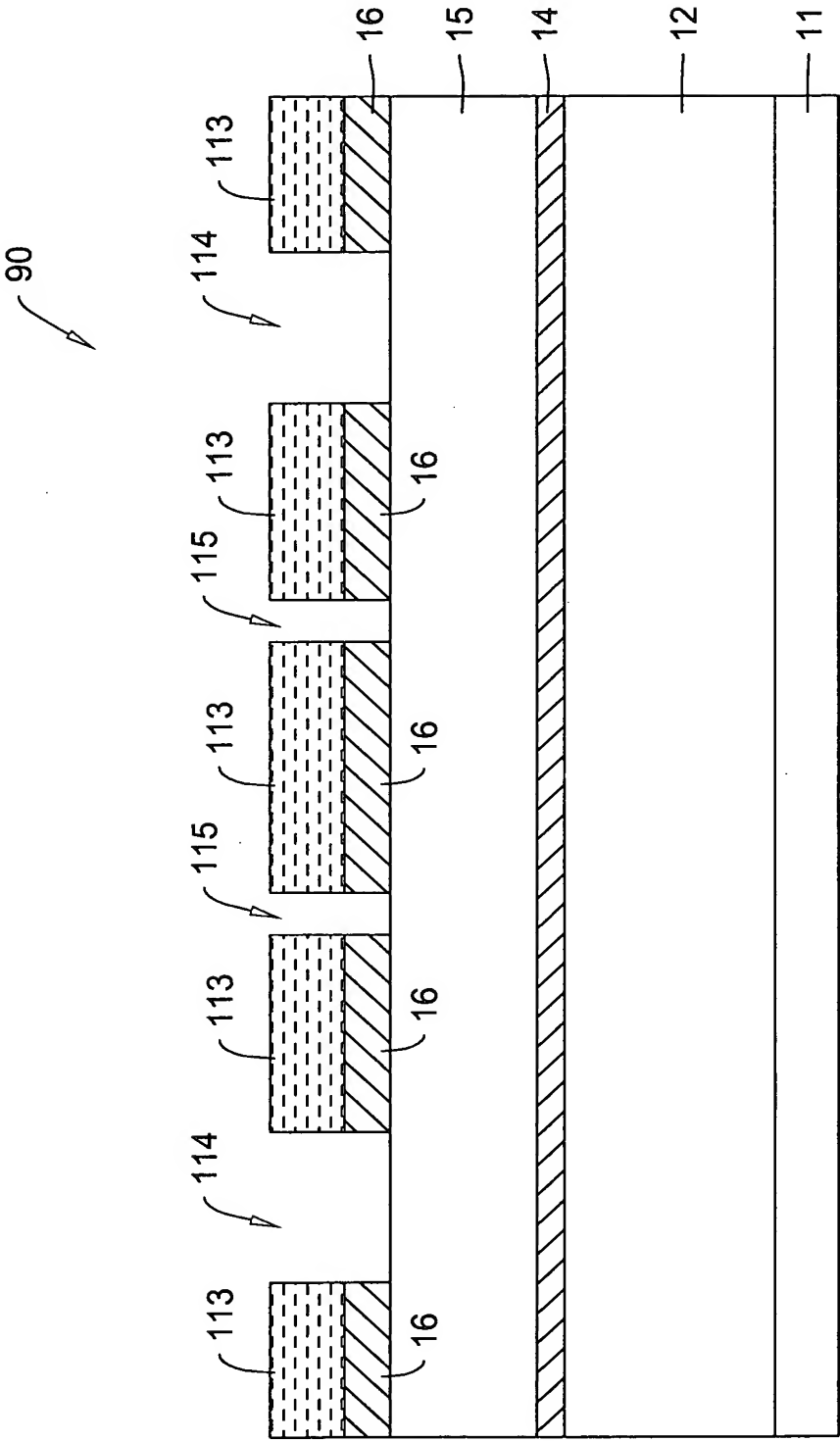


Figure 148

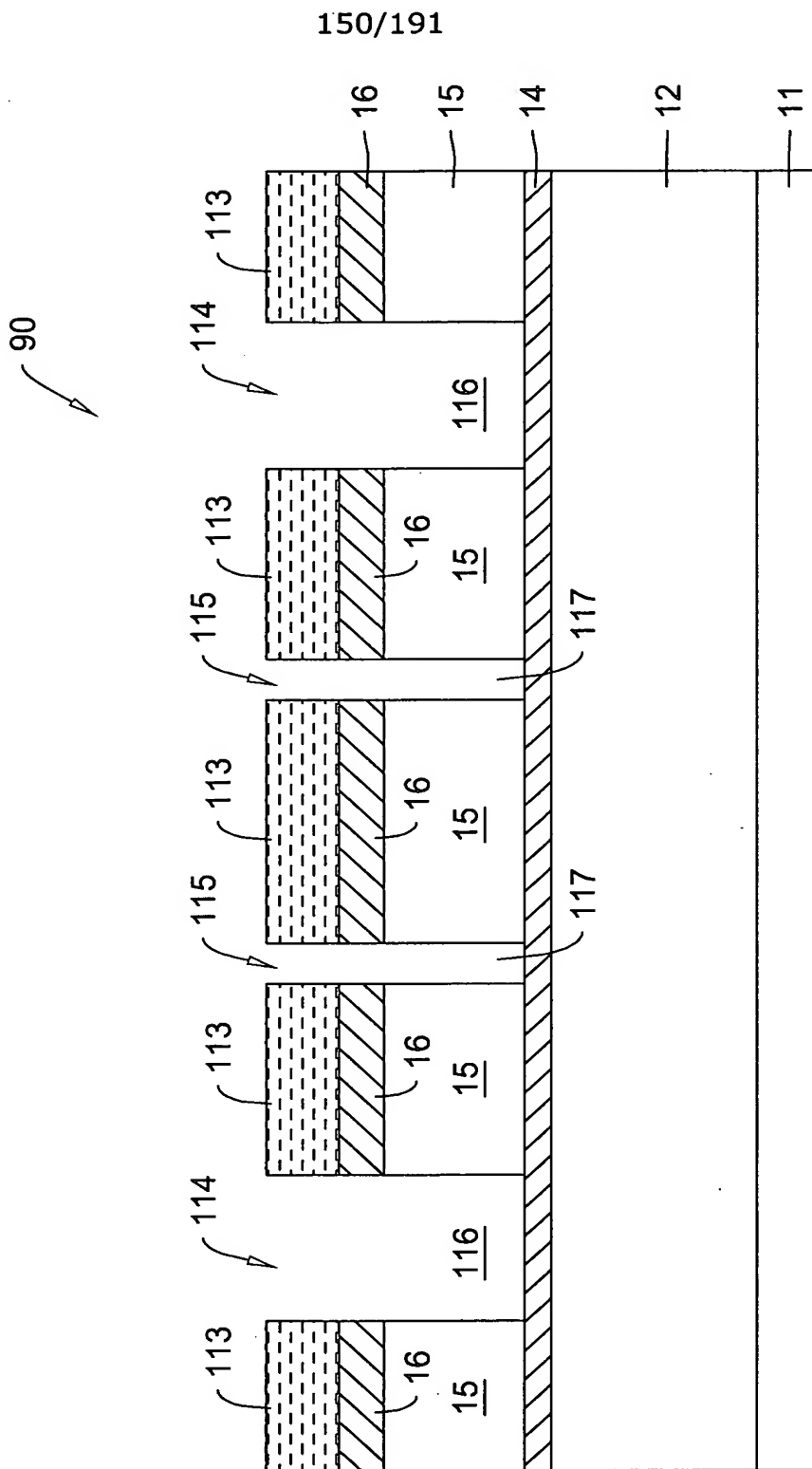


Figure 149

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90

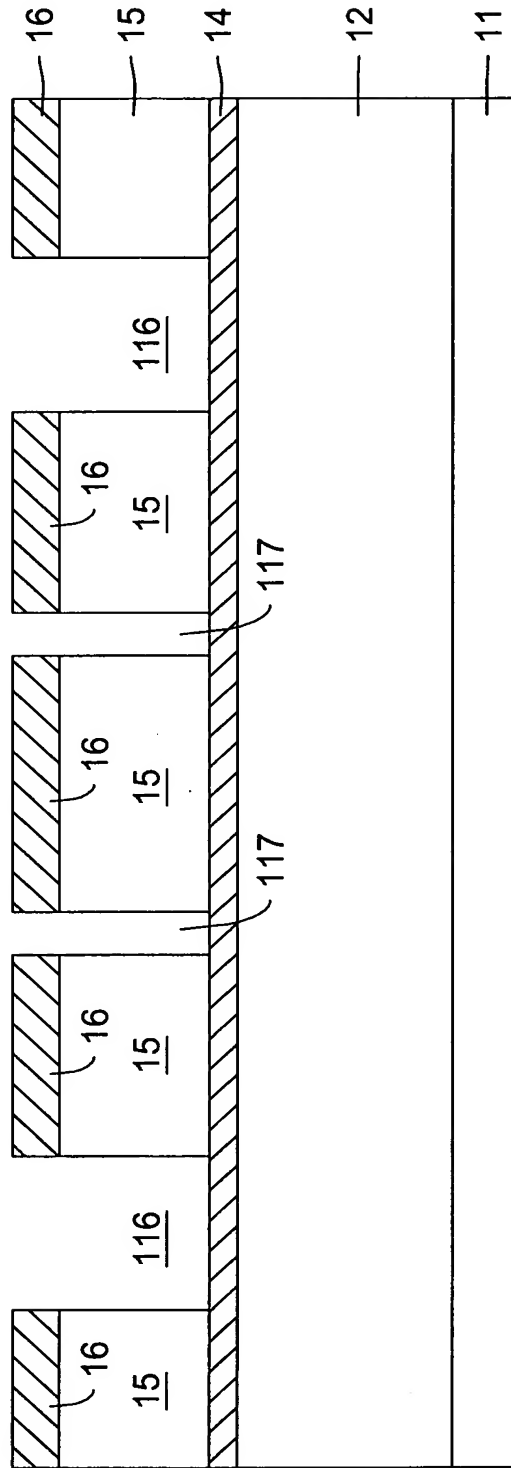


Figure 150

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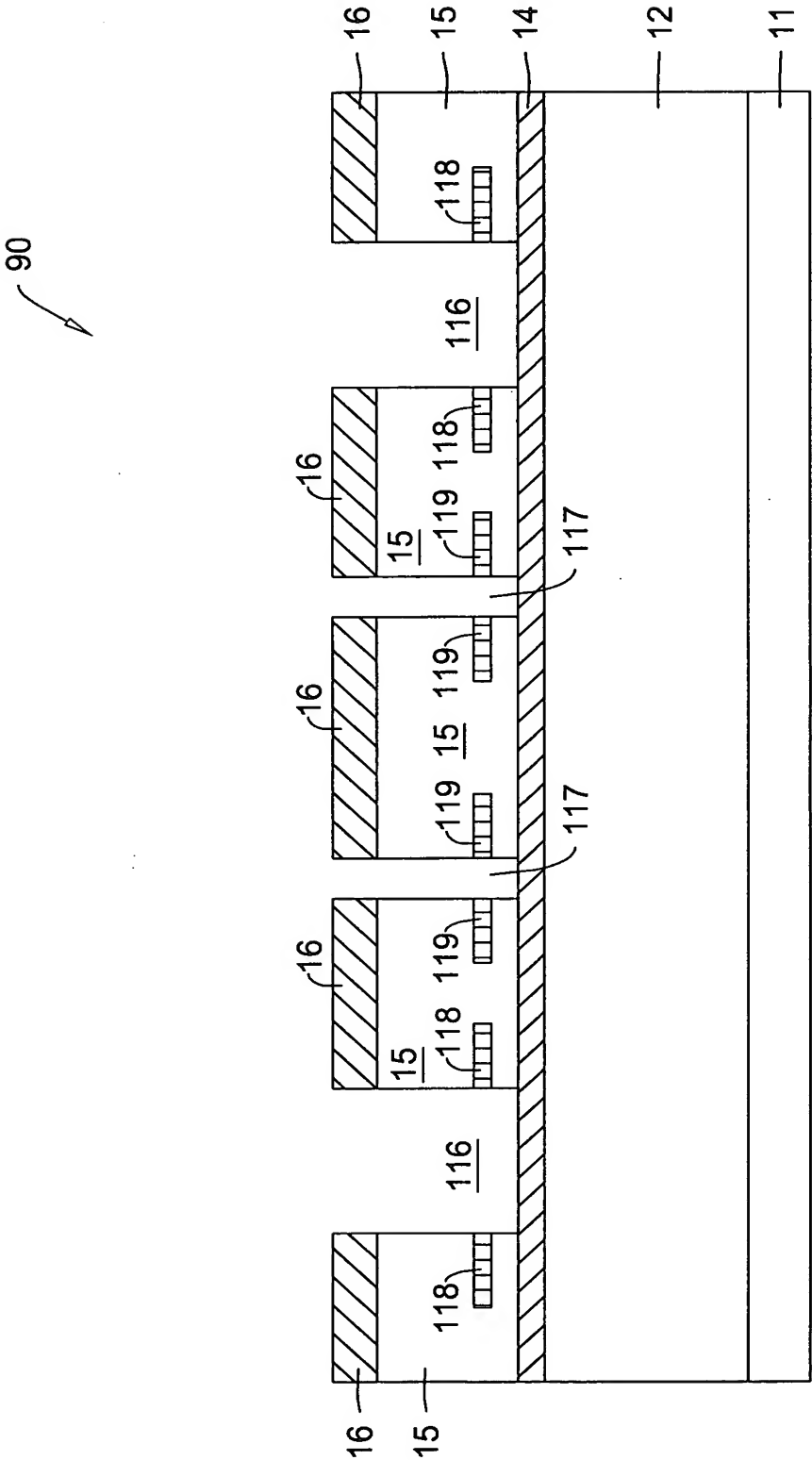


Figure 151

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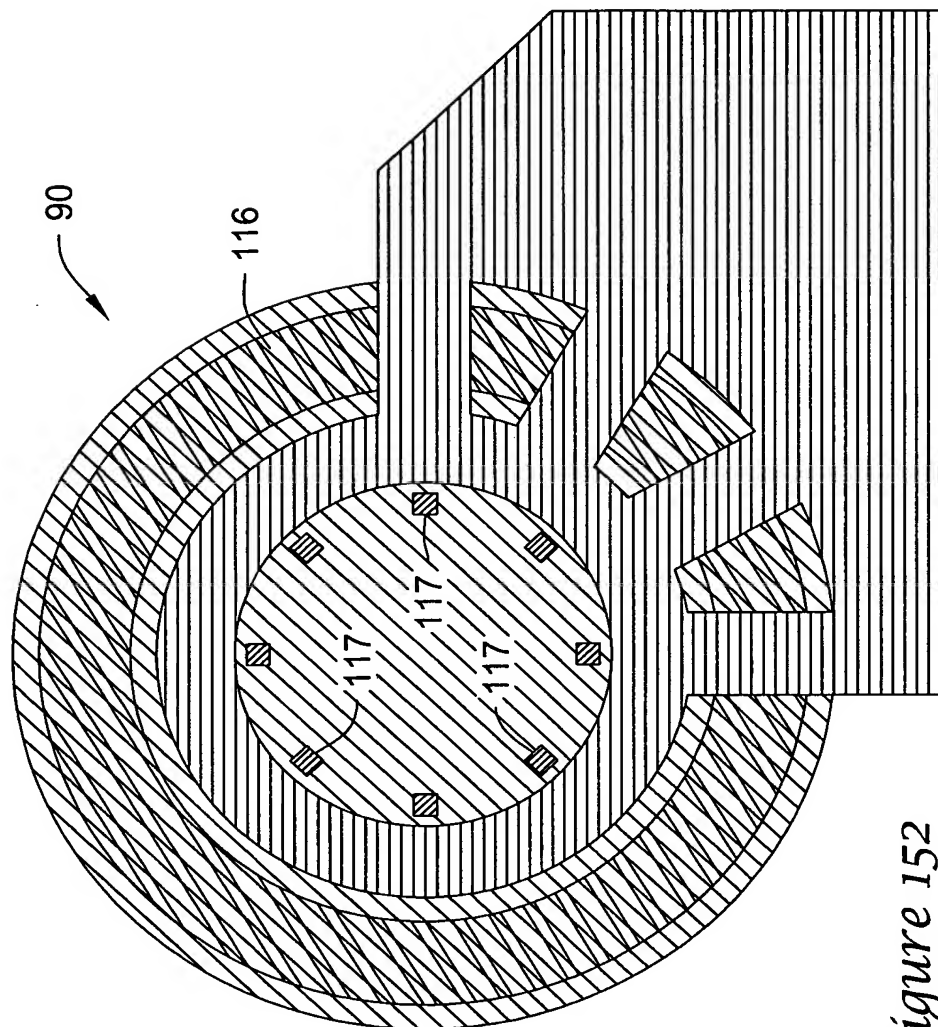


Figure 152



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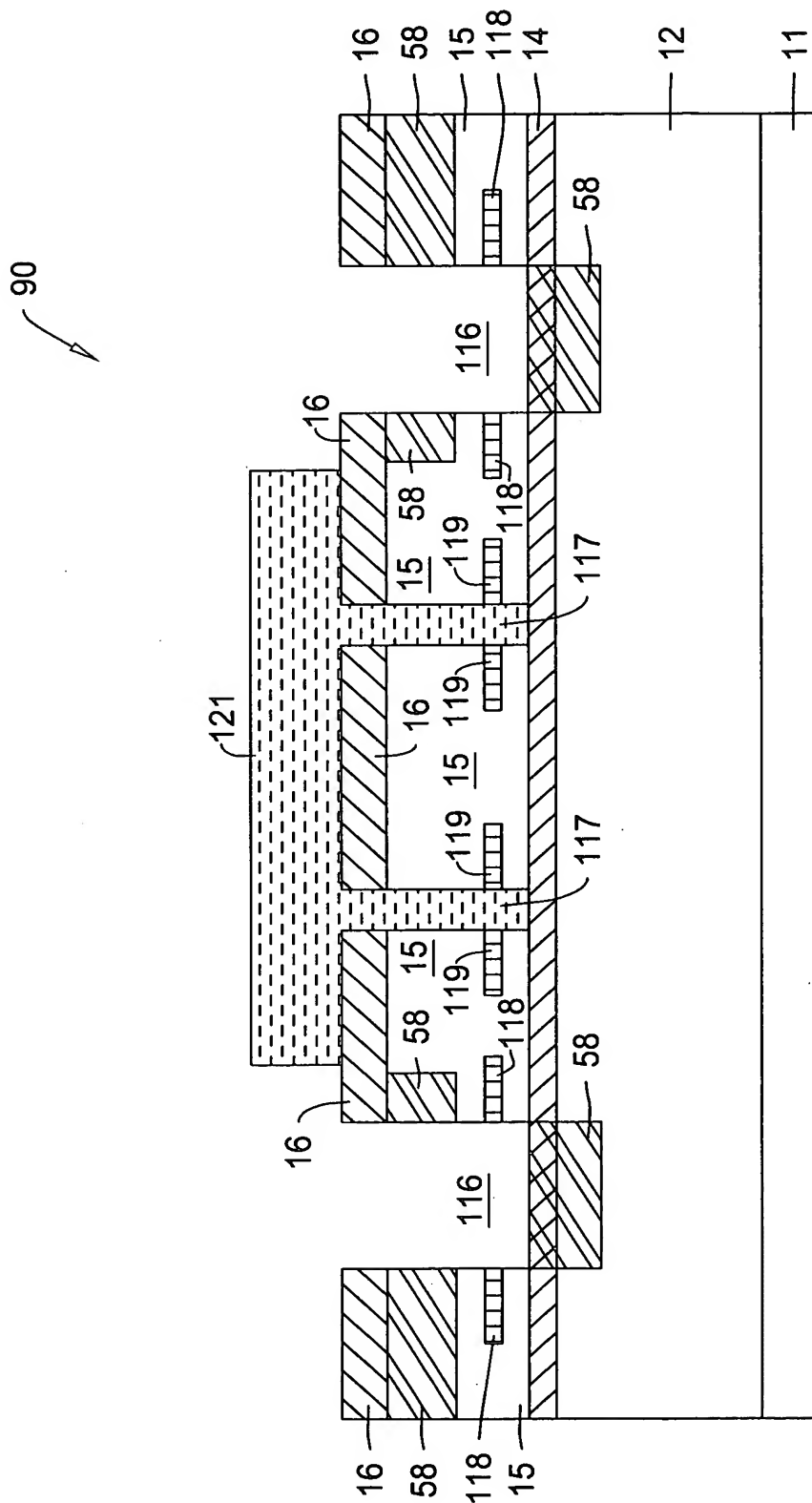


Figure 154

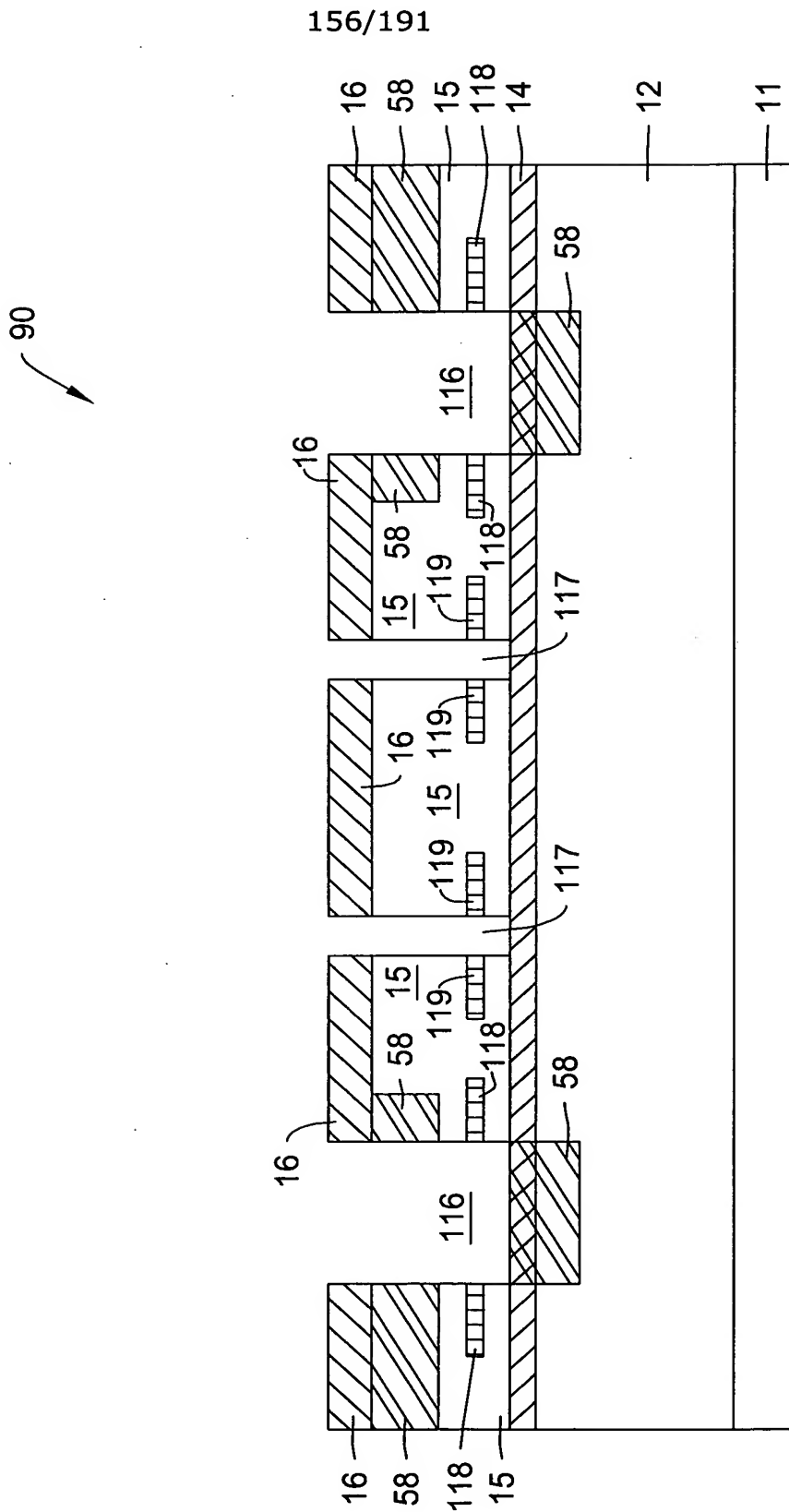


Figure 155



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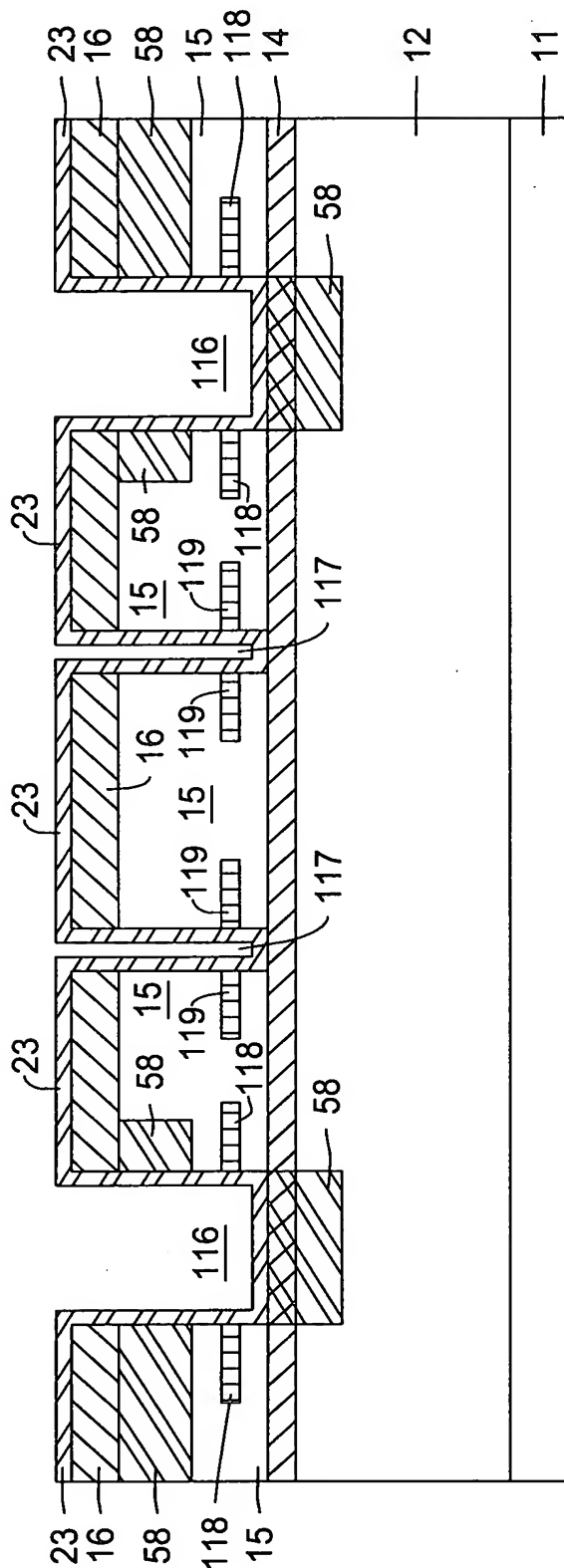


Figure 156

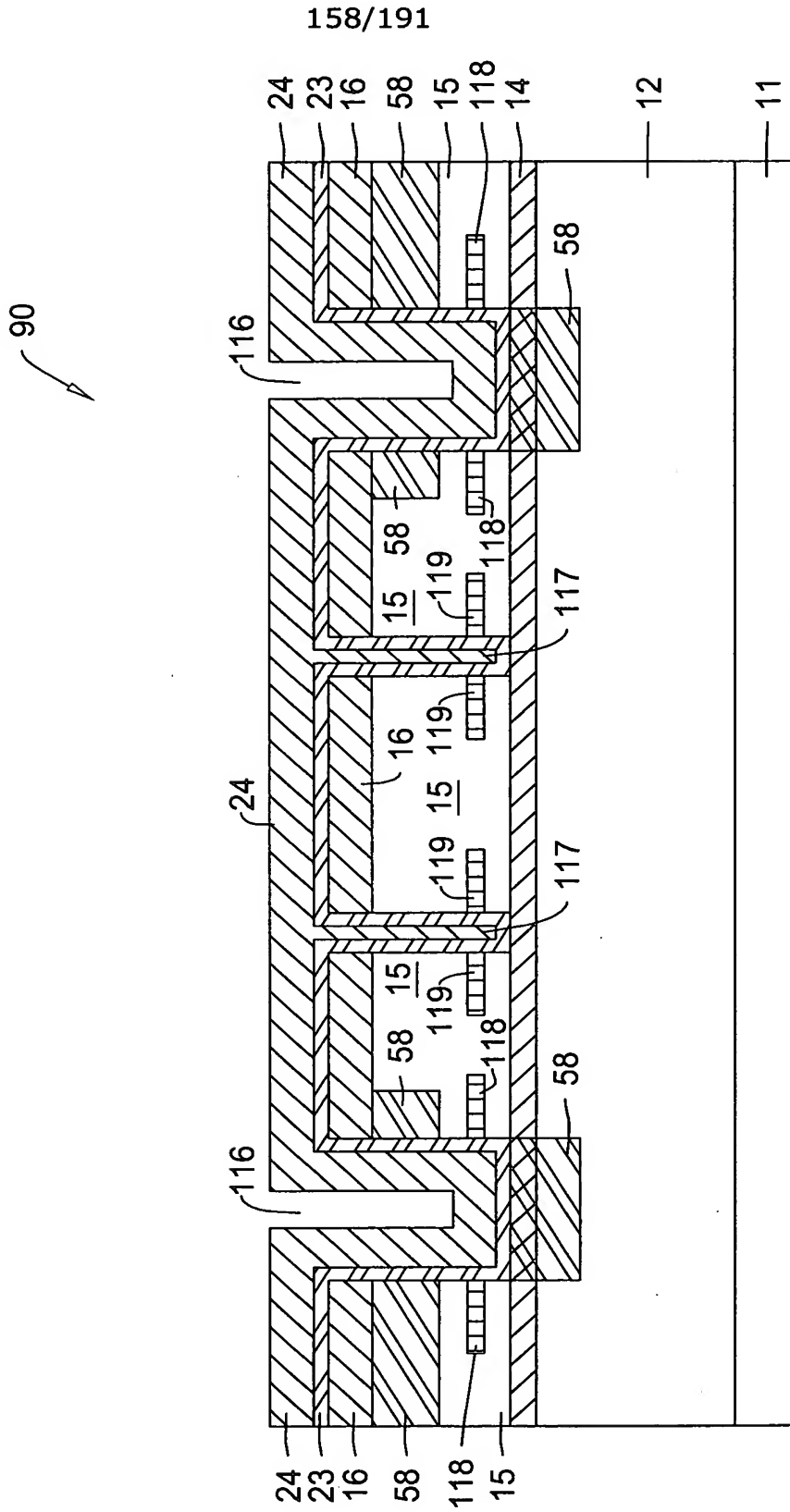
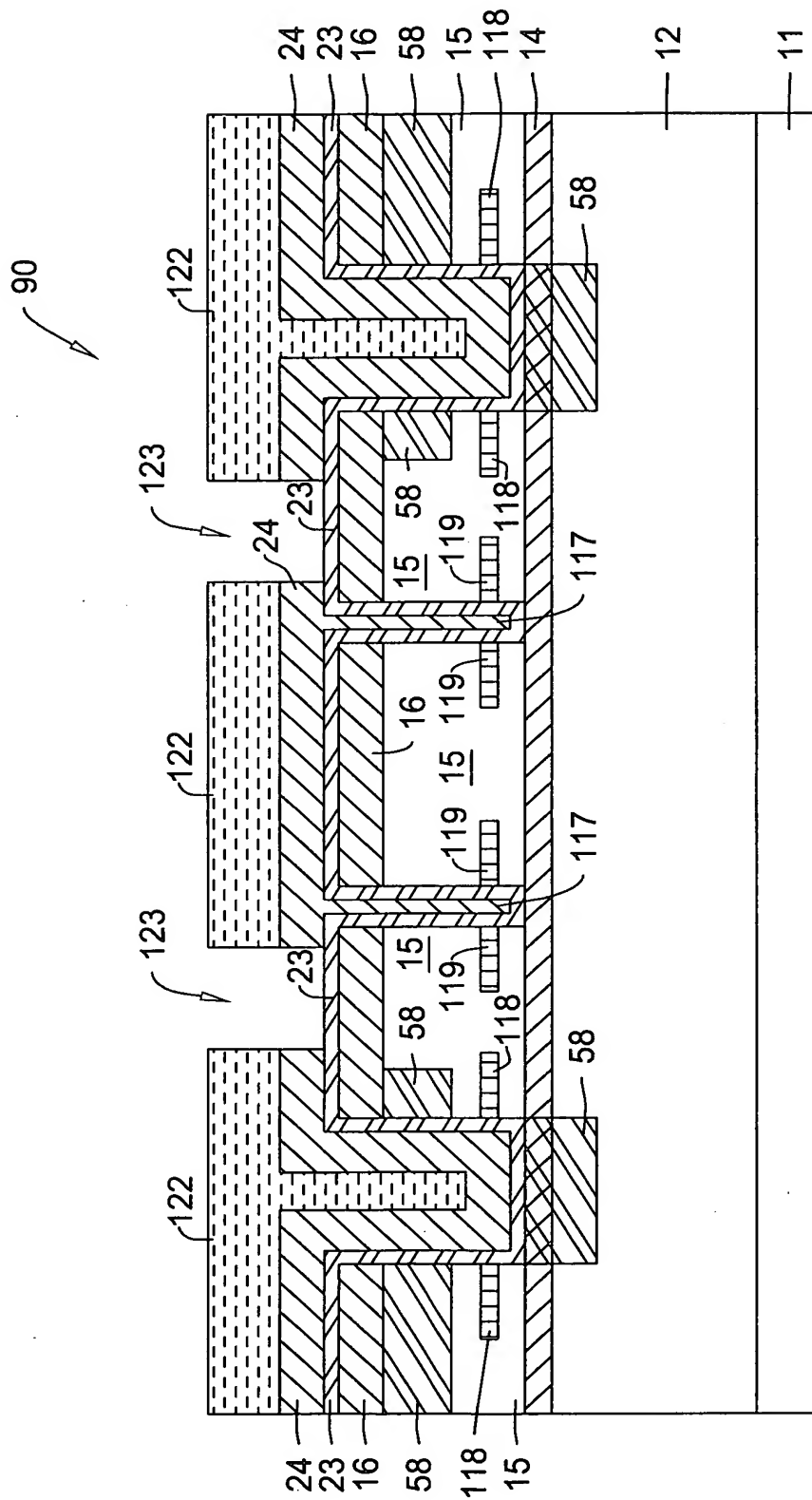


Figure 157





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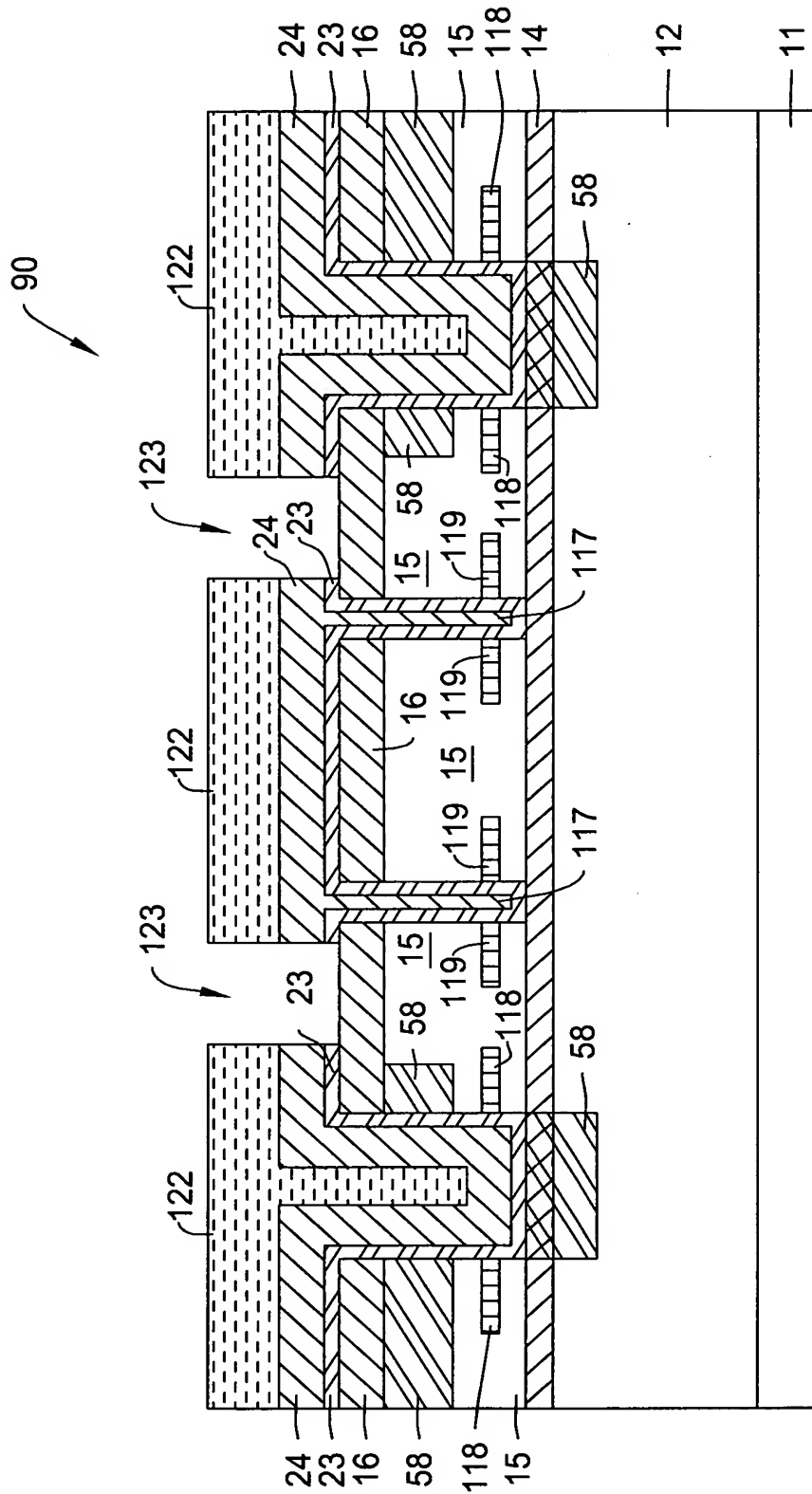


Figure 160

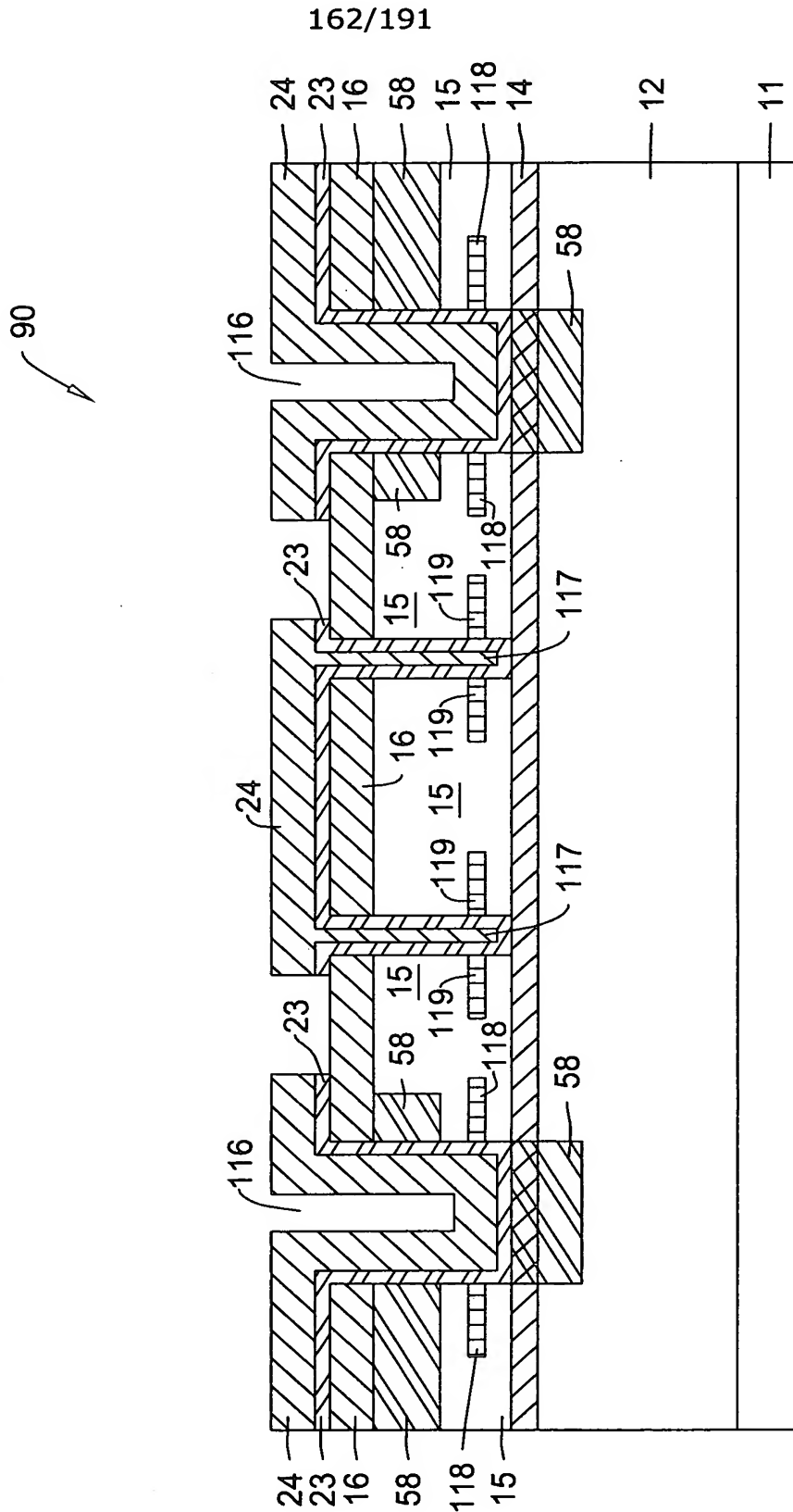


Figure 161

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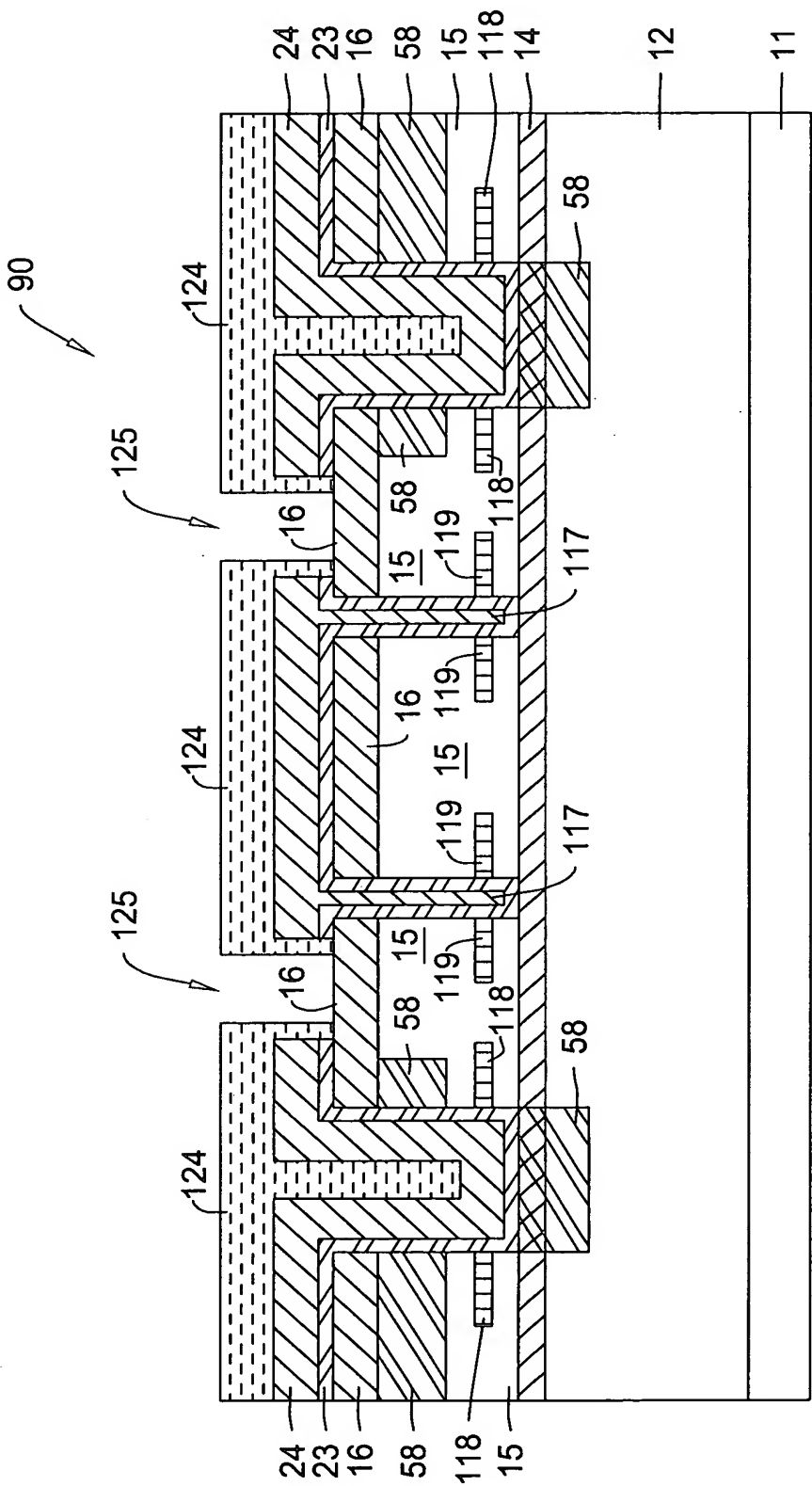


Figure 162

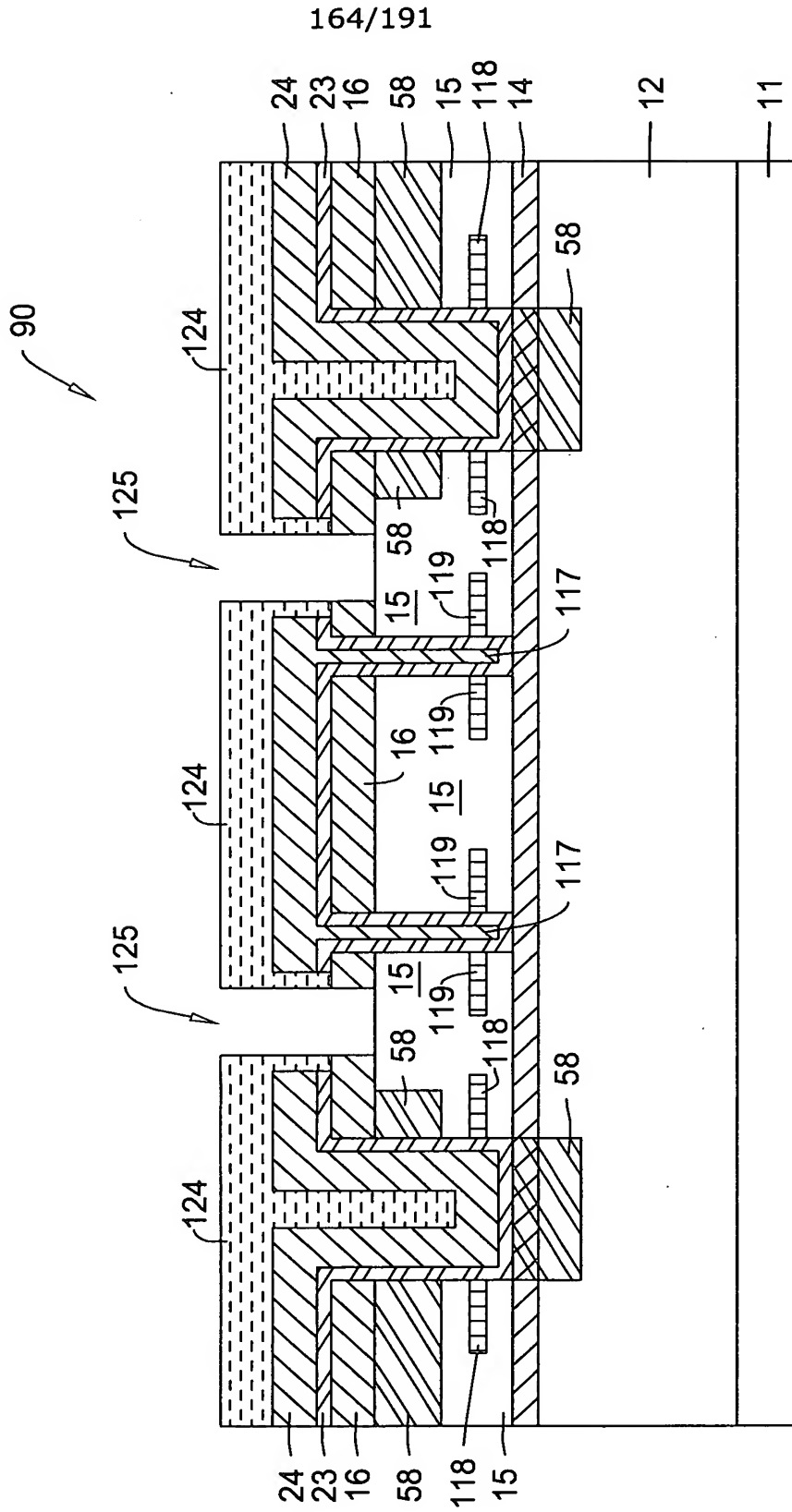


Figure 163



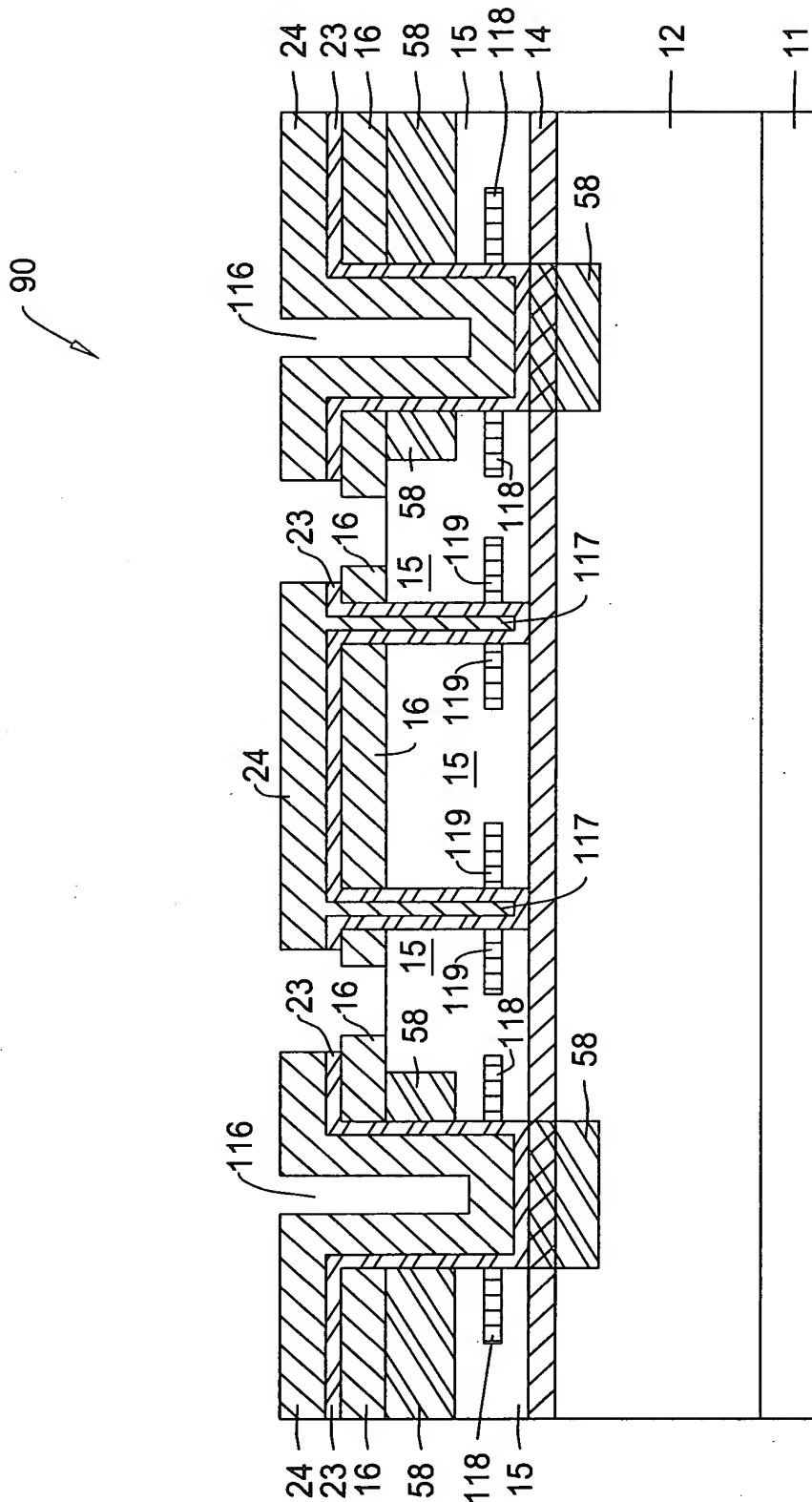


Figure 164

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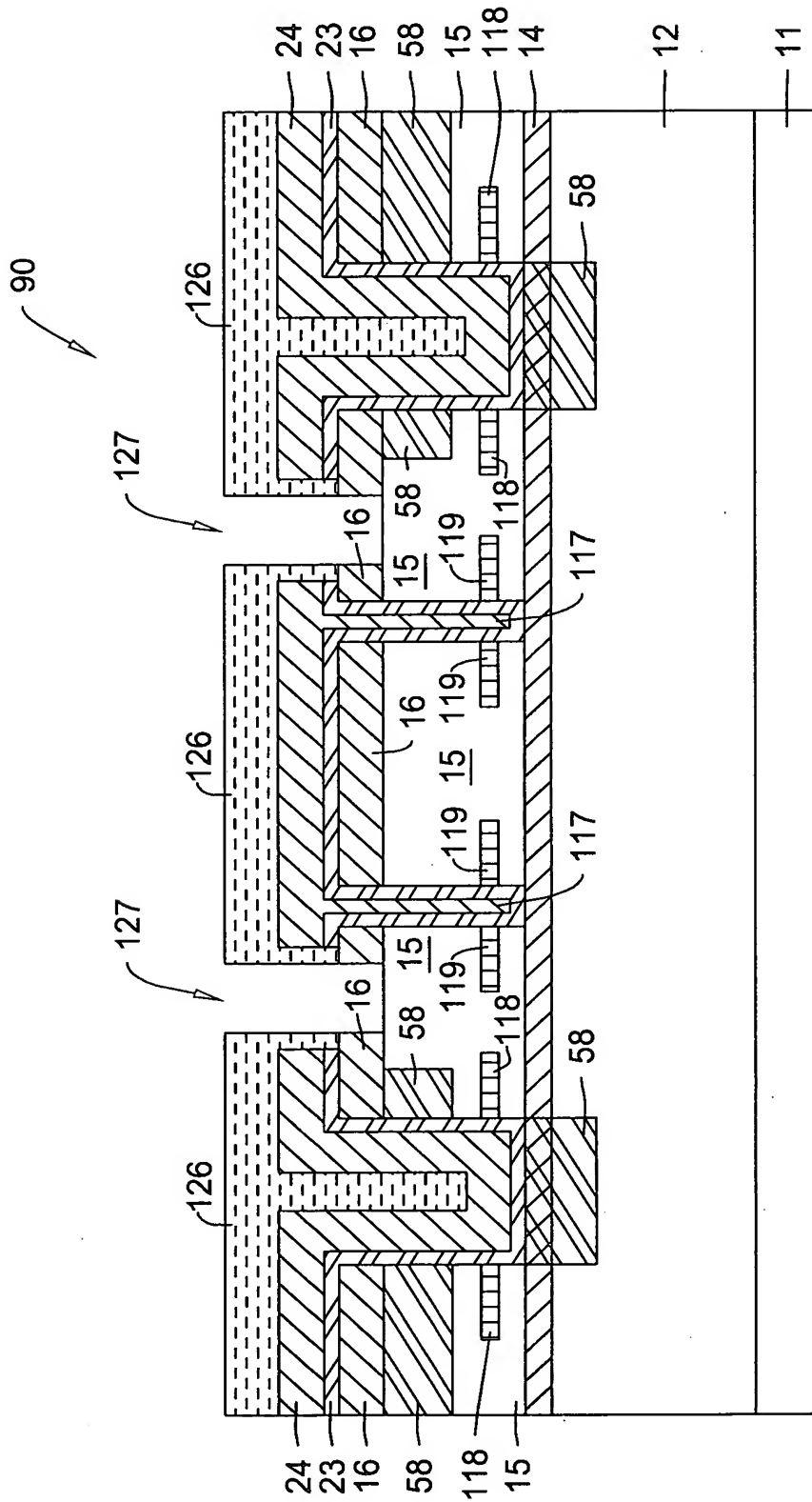


Figure 165

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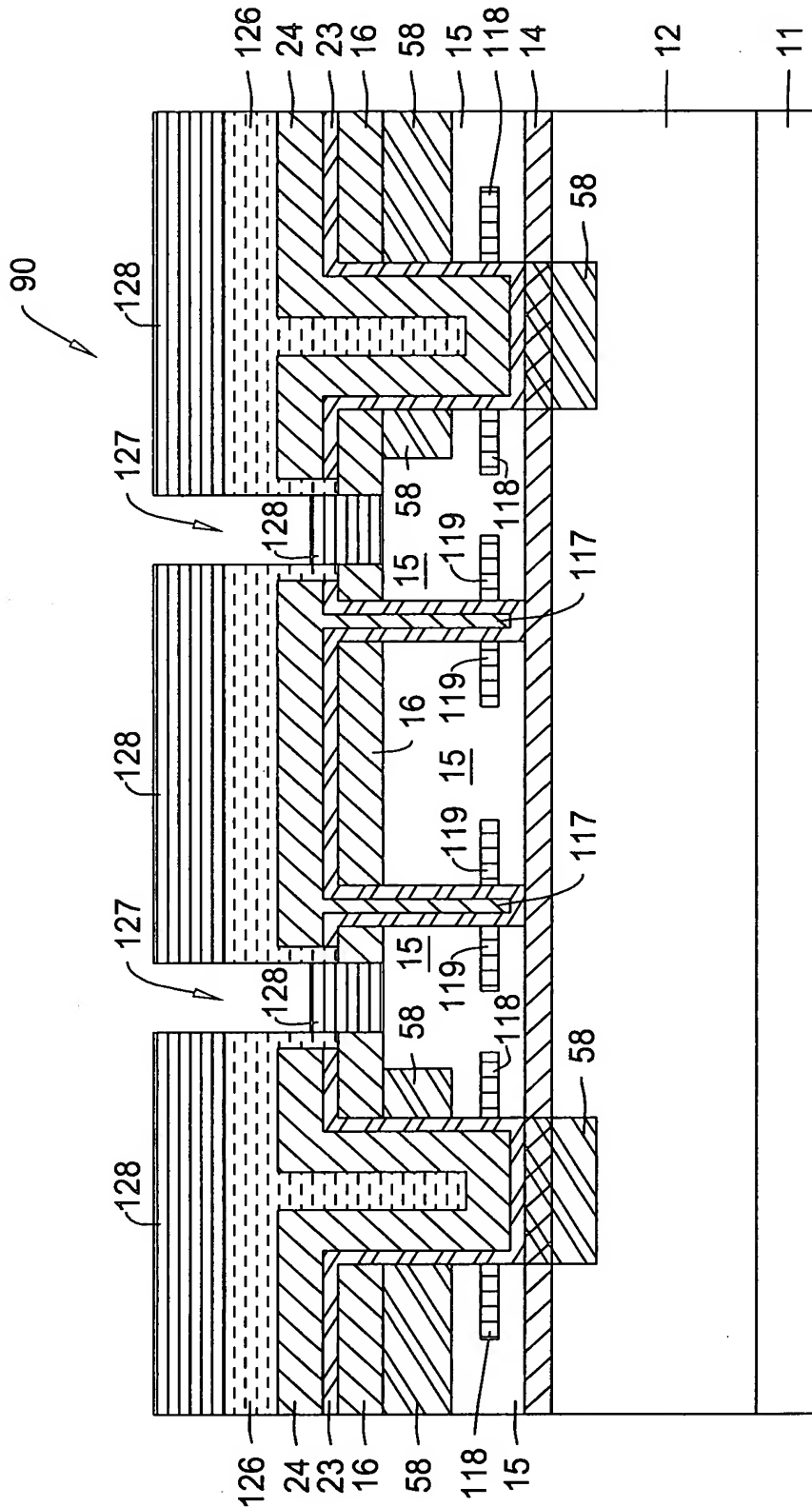


Figure 166

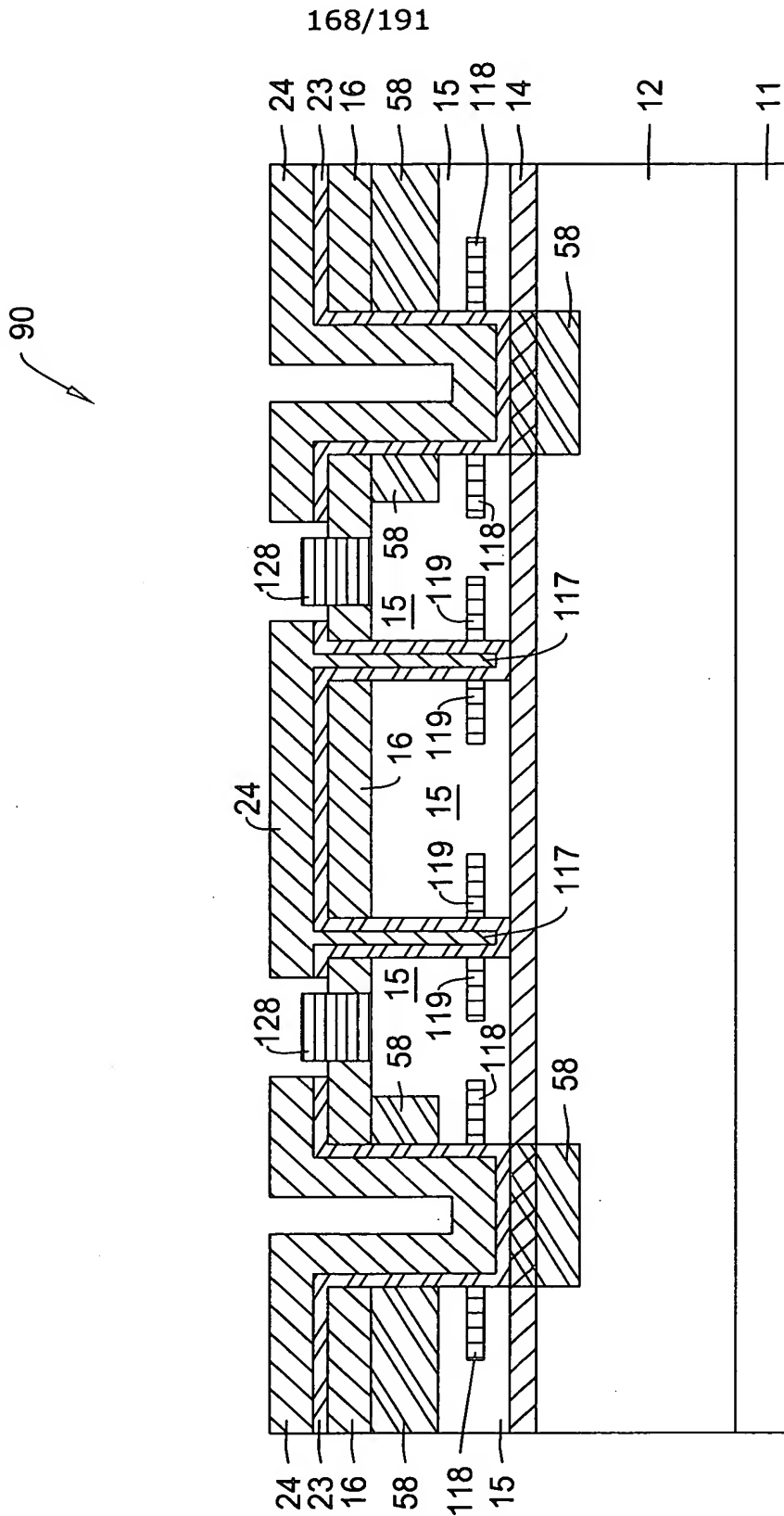


Figure 167

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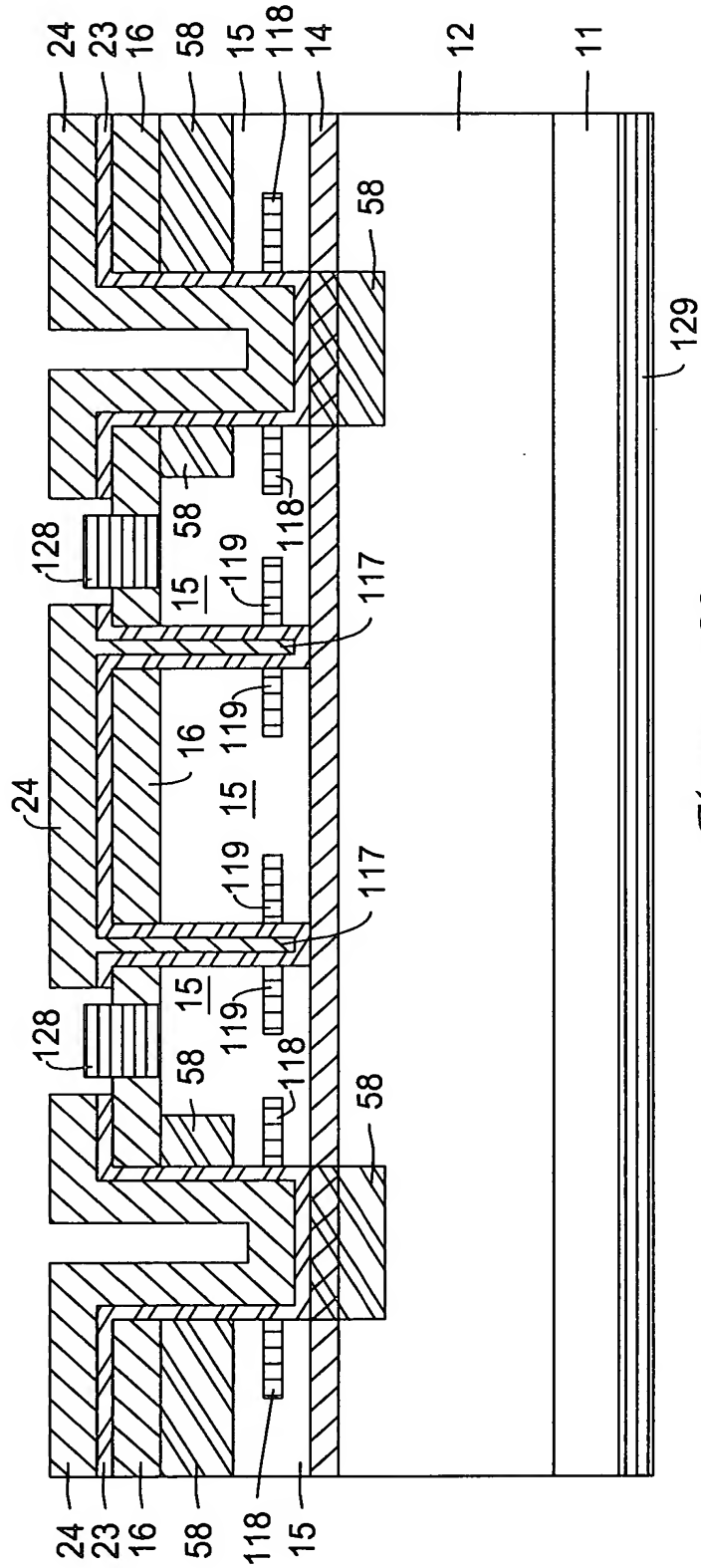


Figure 168

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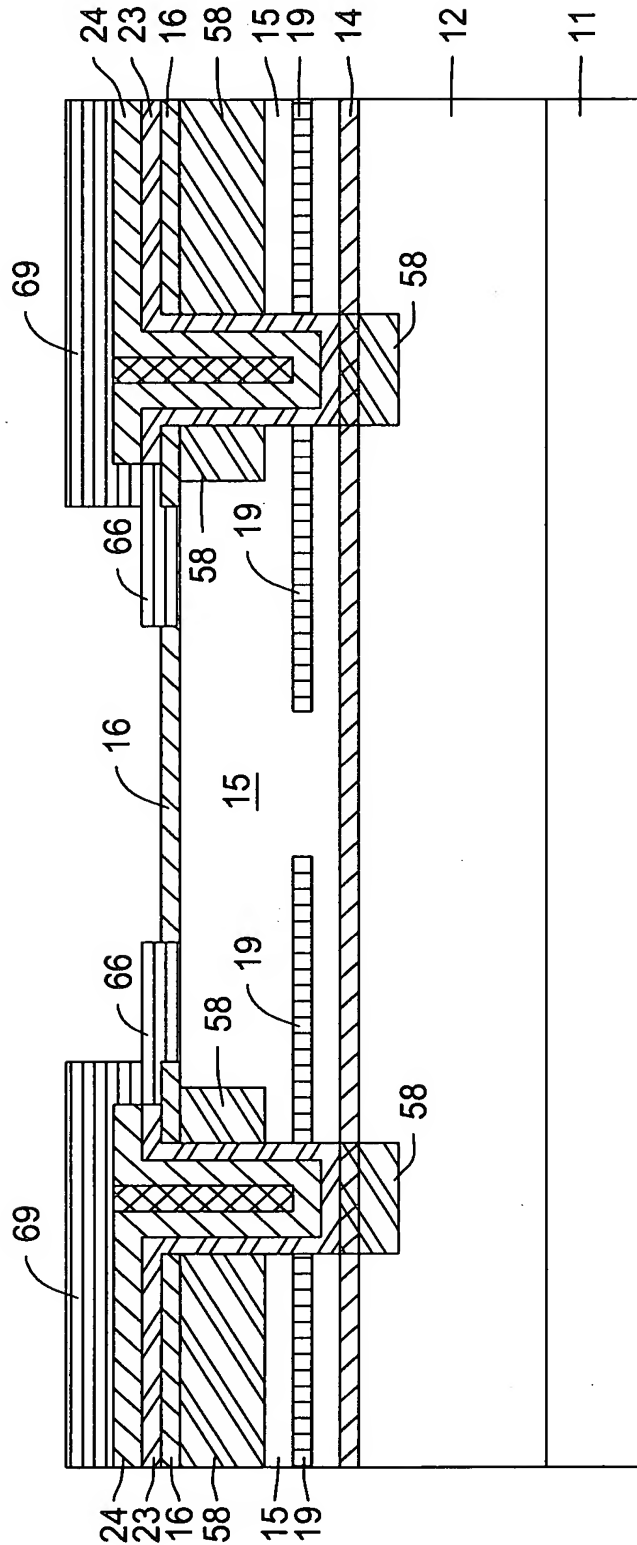


Figure 169

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100

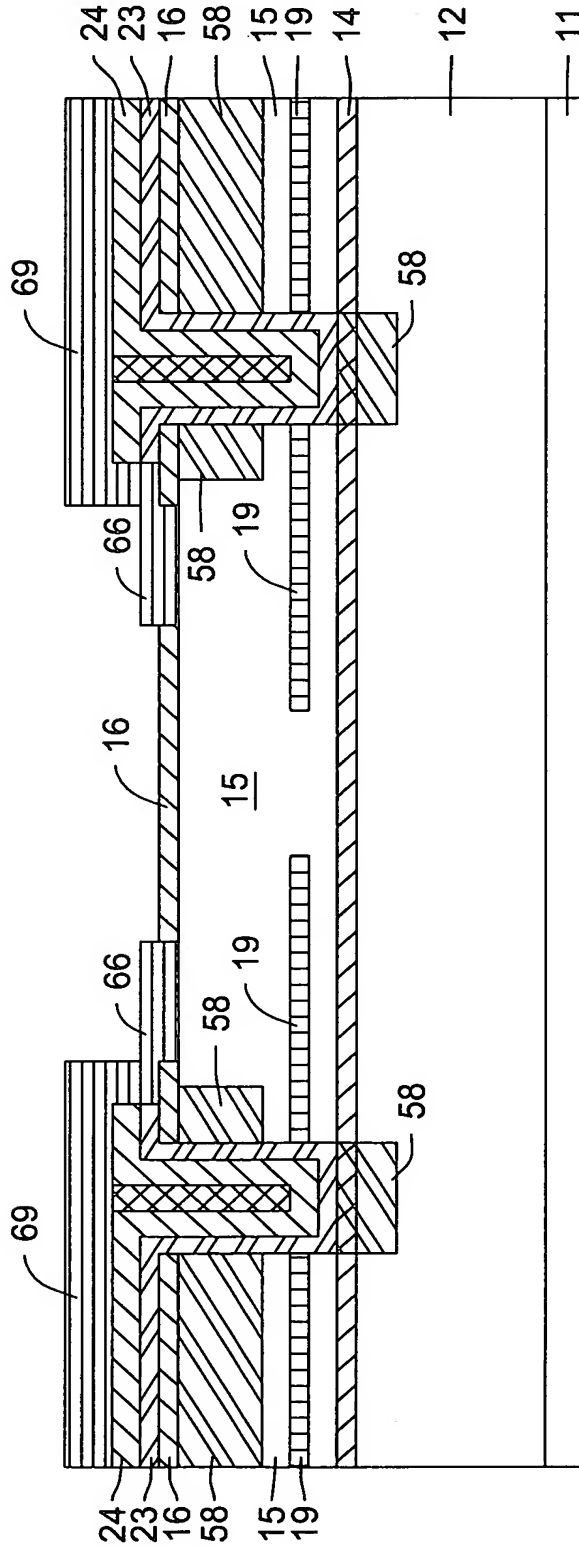


Figure 170

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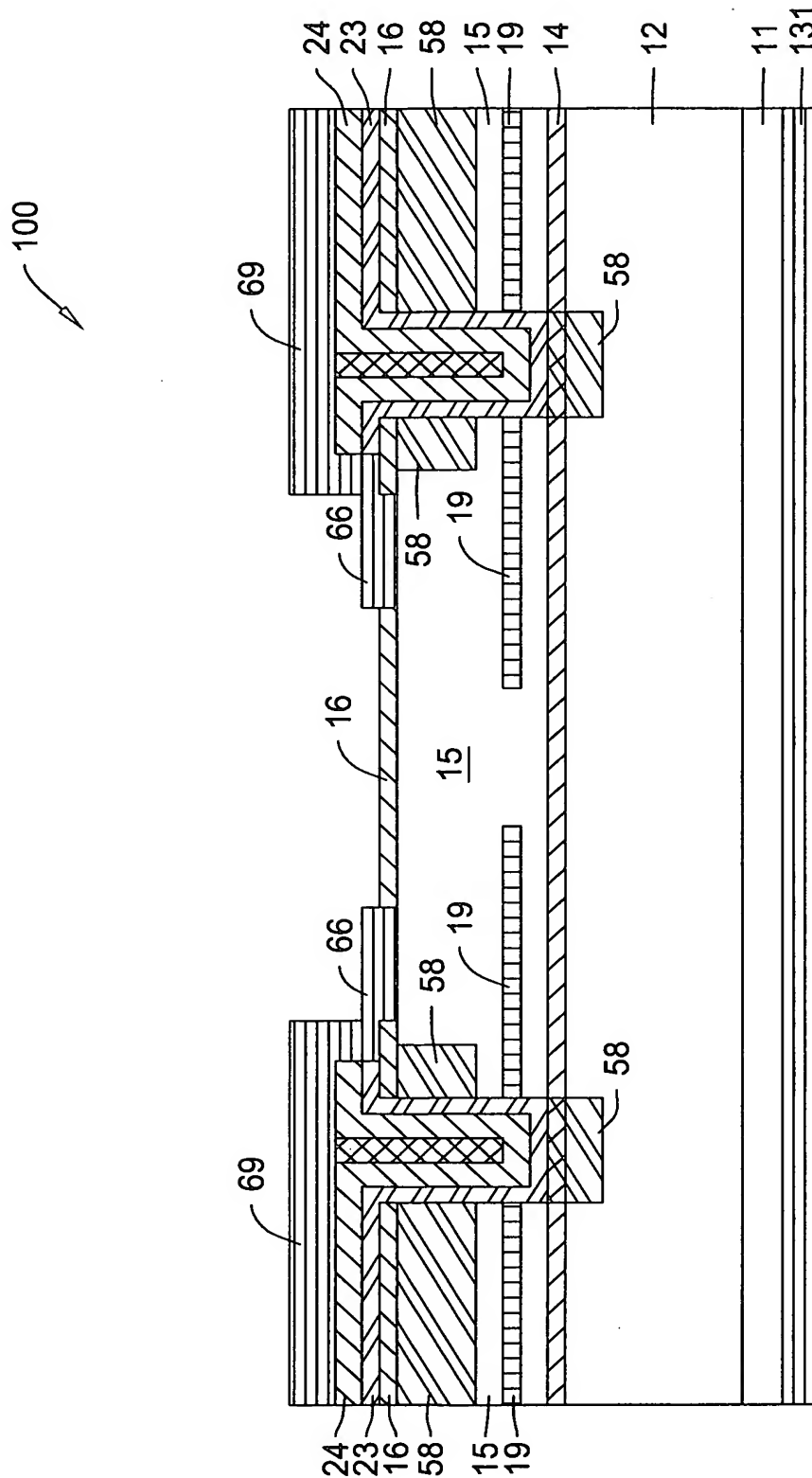


Figure 171



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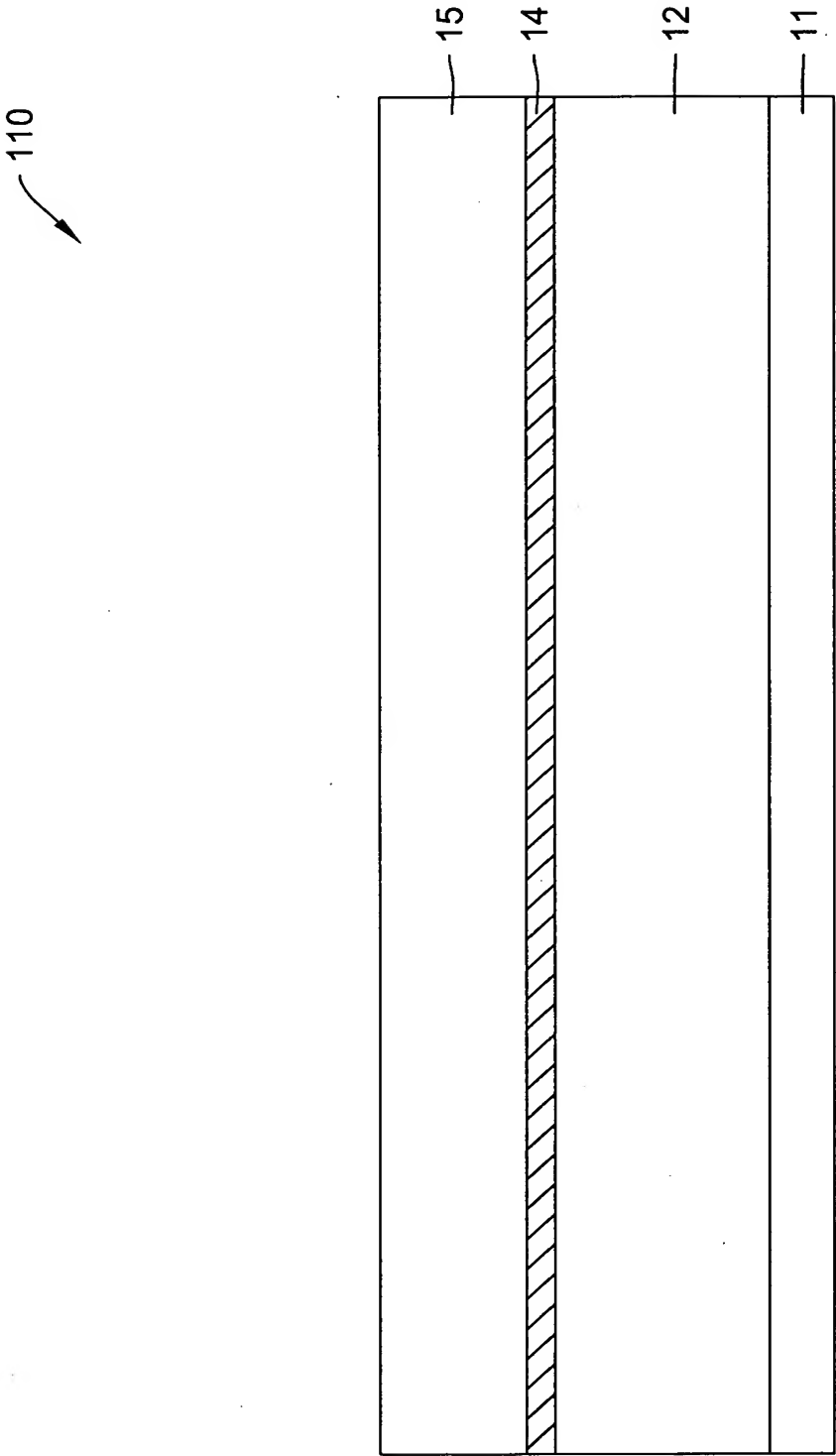


Figure 172

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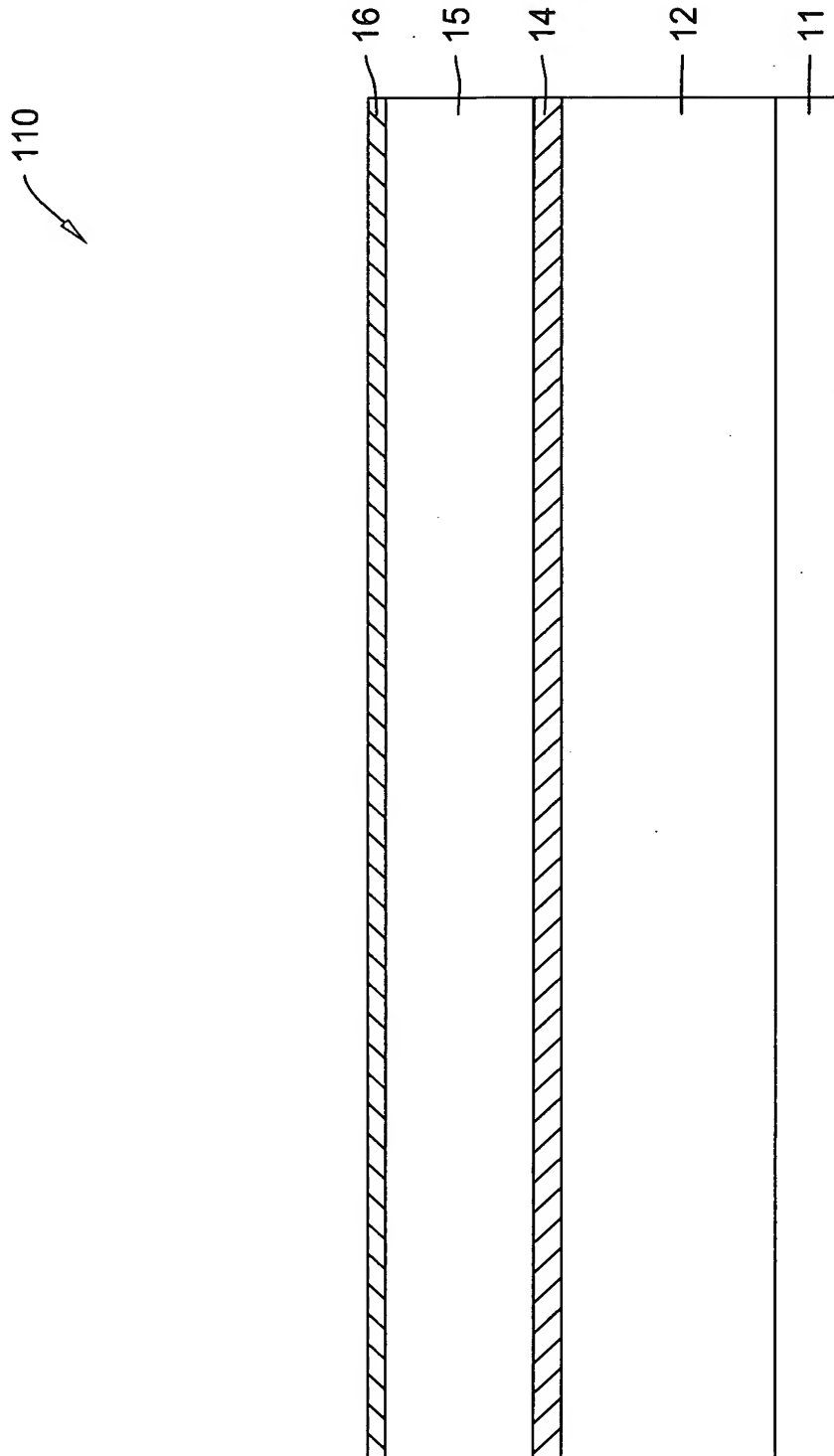


Figure 173

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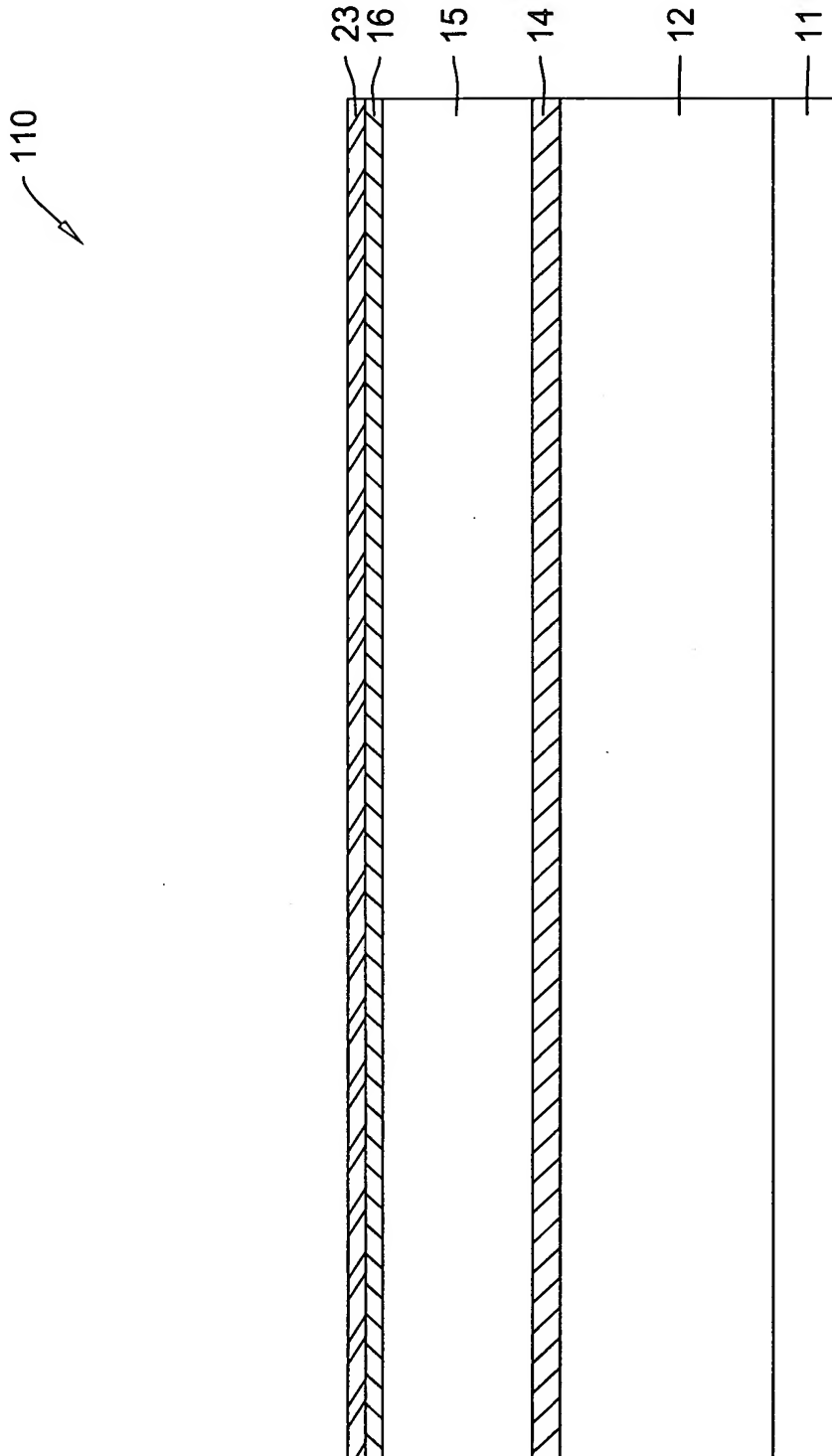


Figure 174

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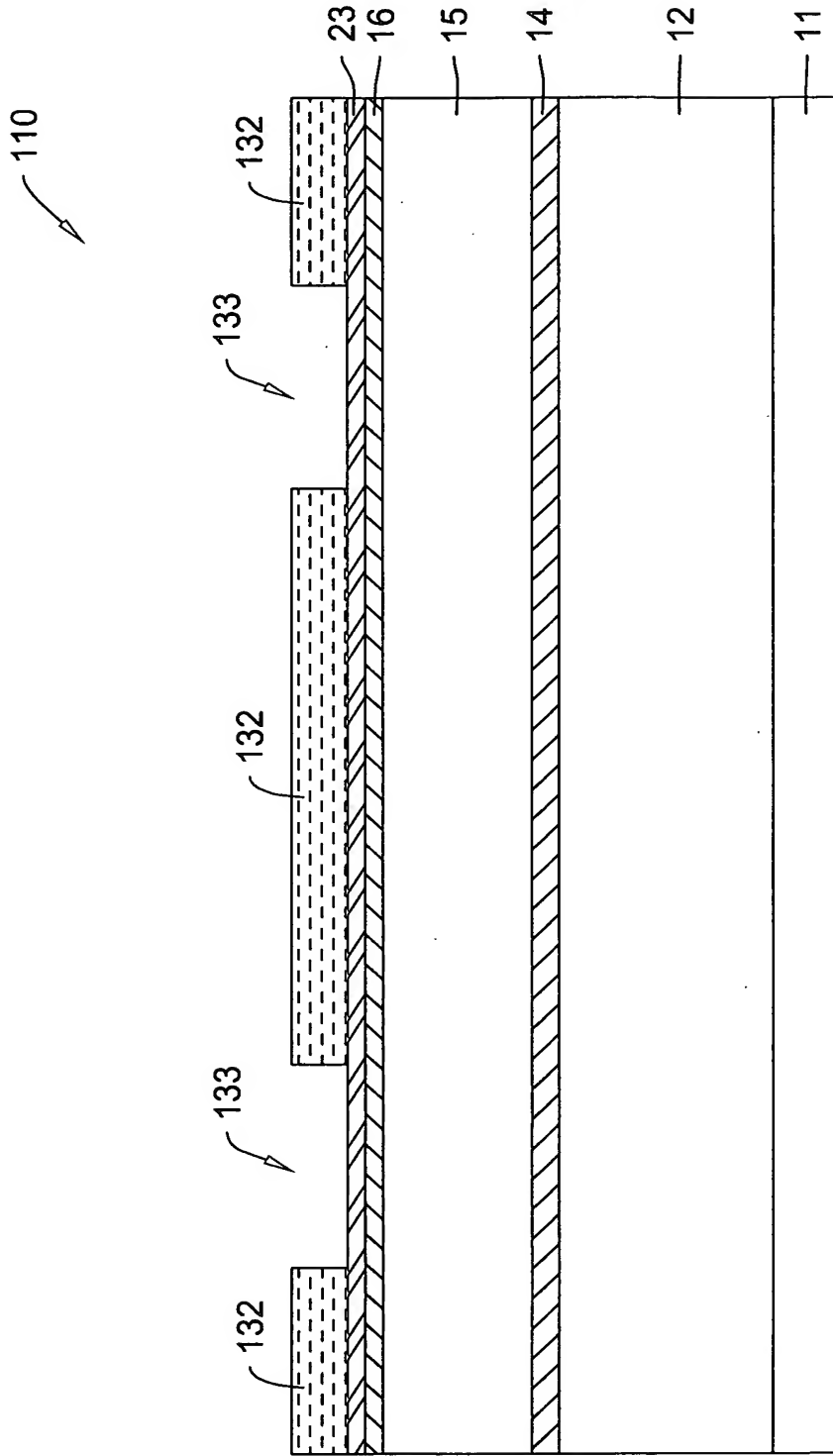


Figure 175

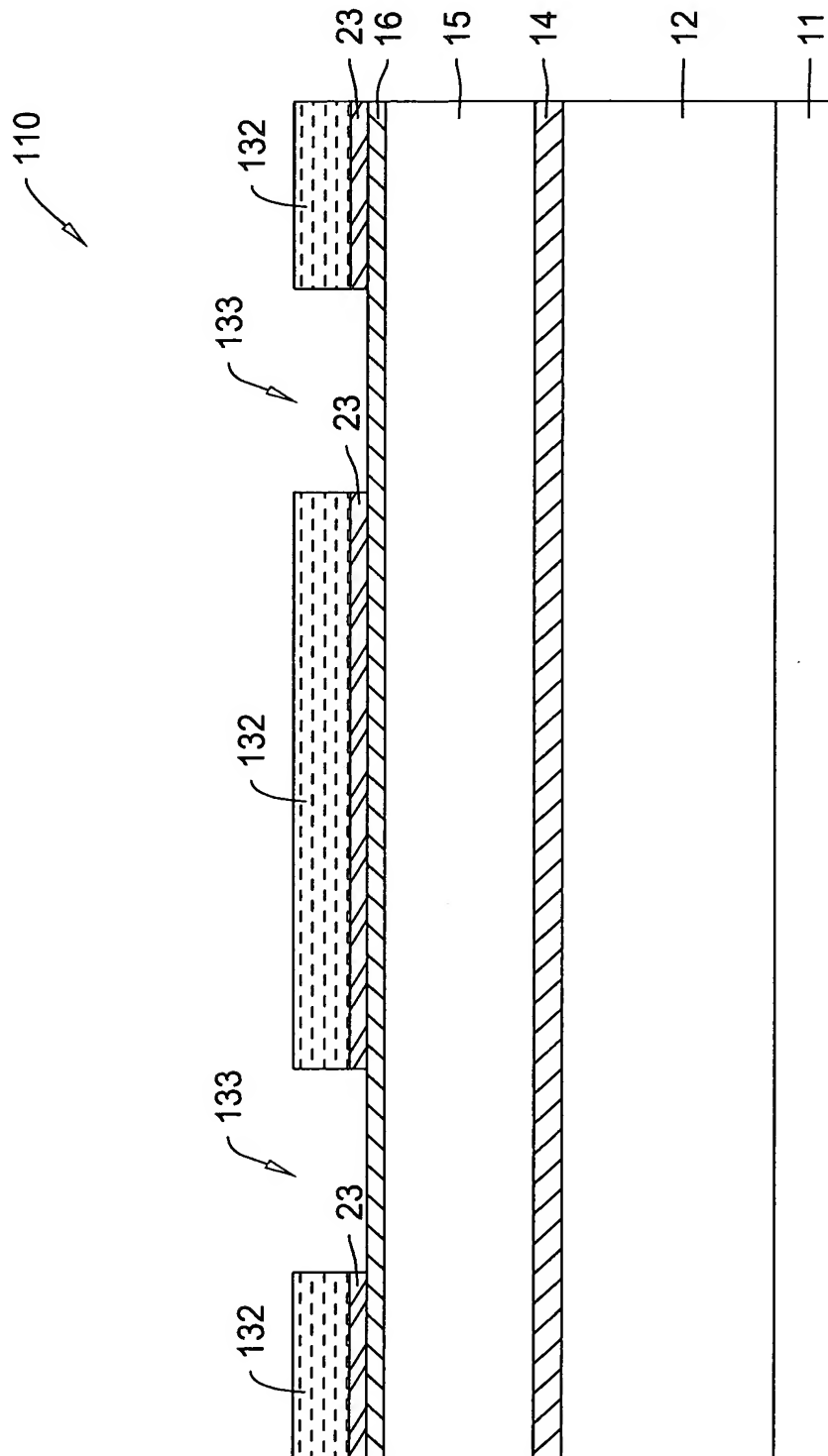


Figure 176

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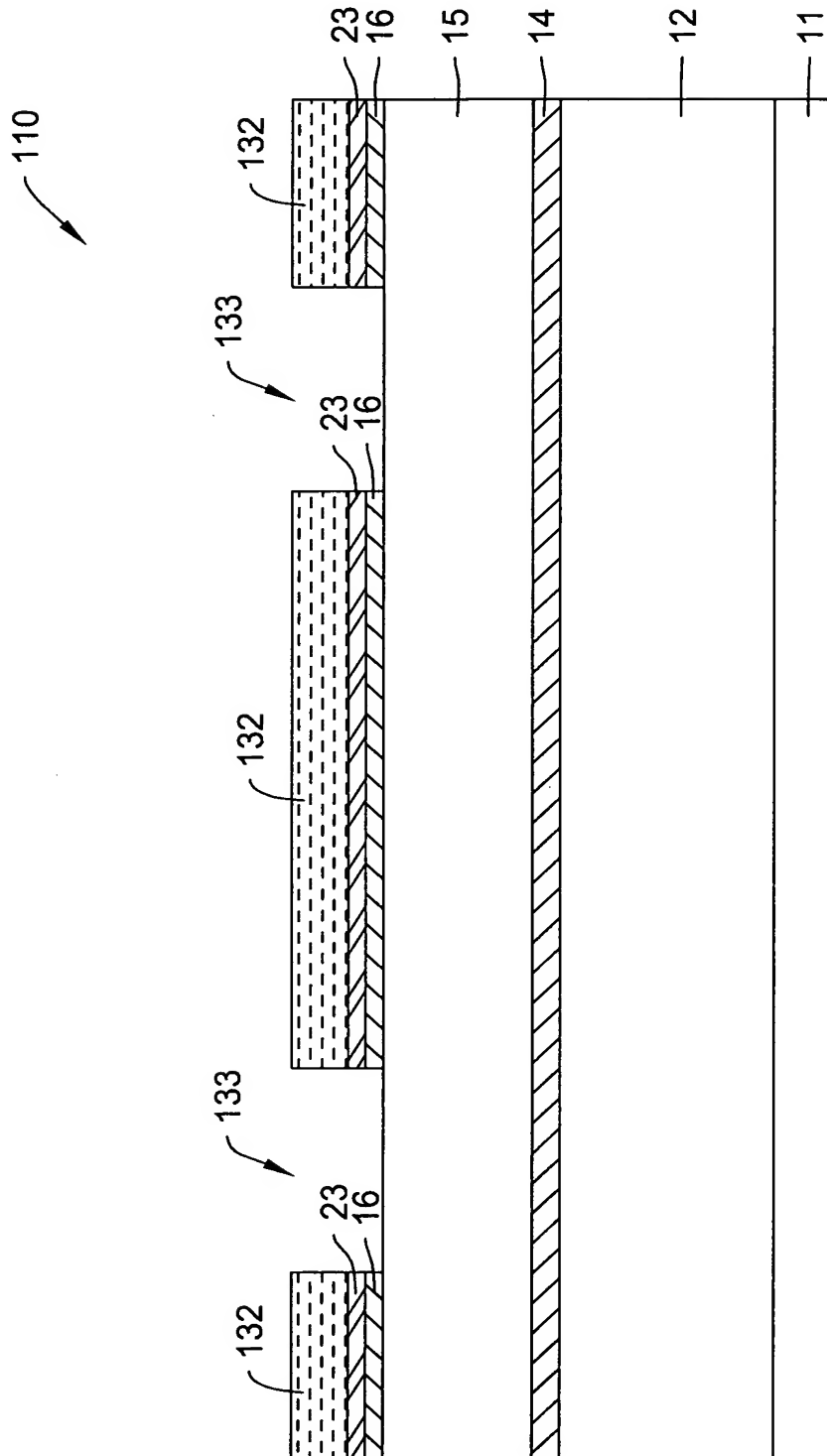


Figure 177

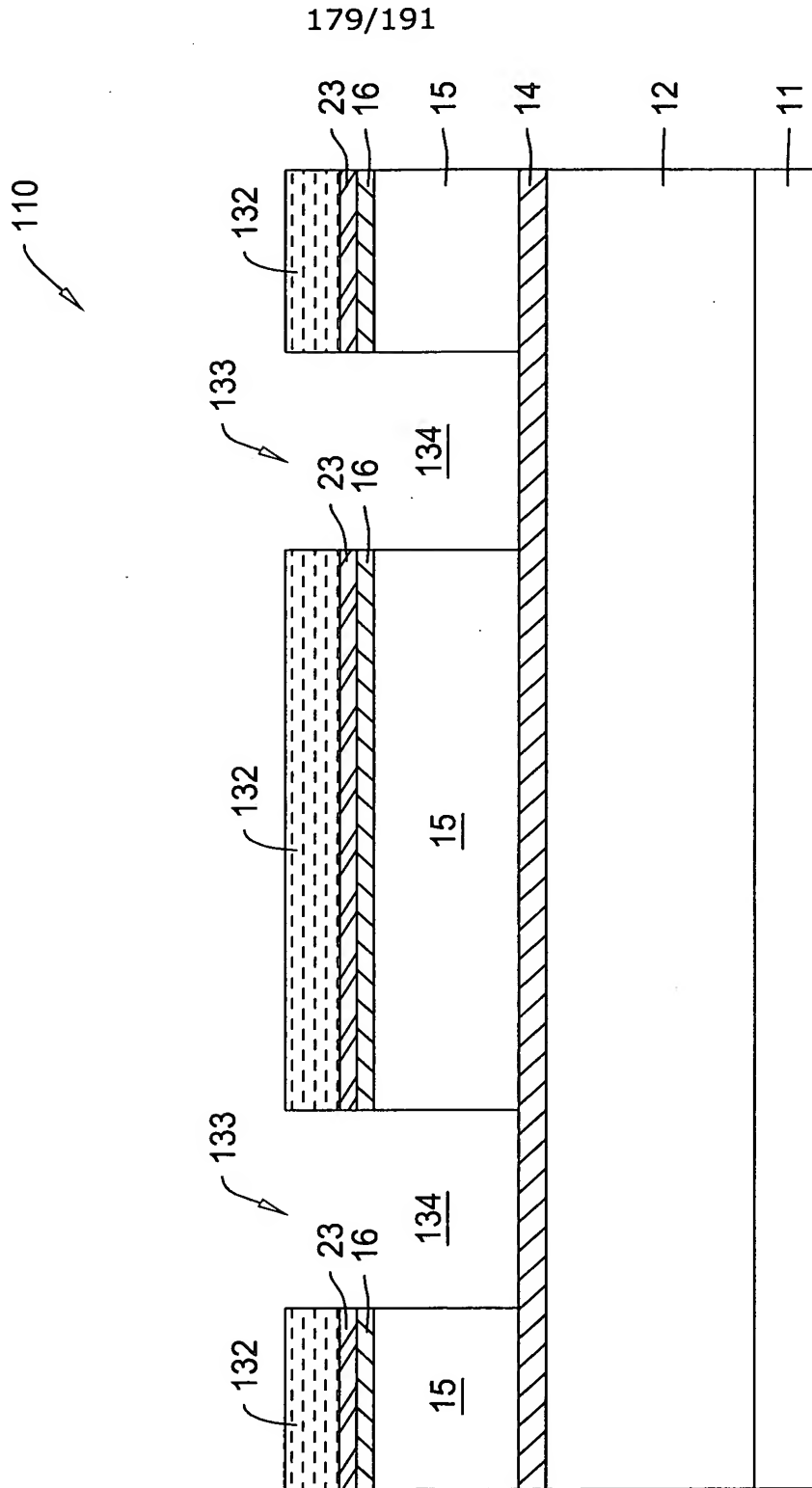


Figure 178

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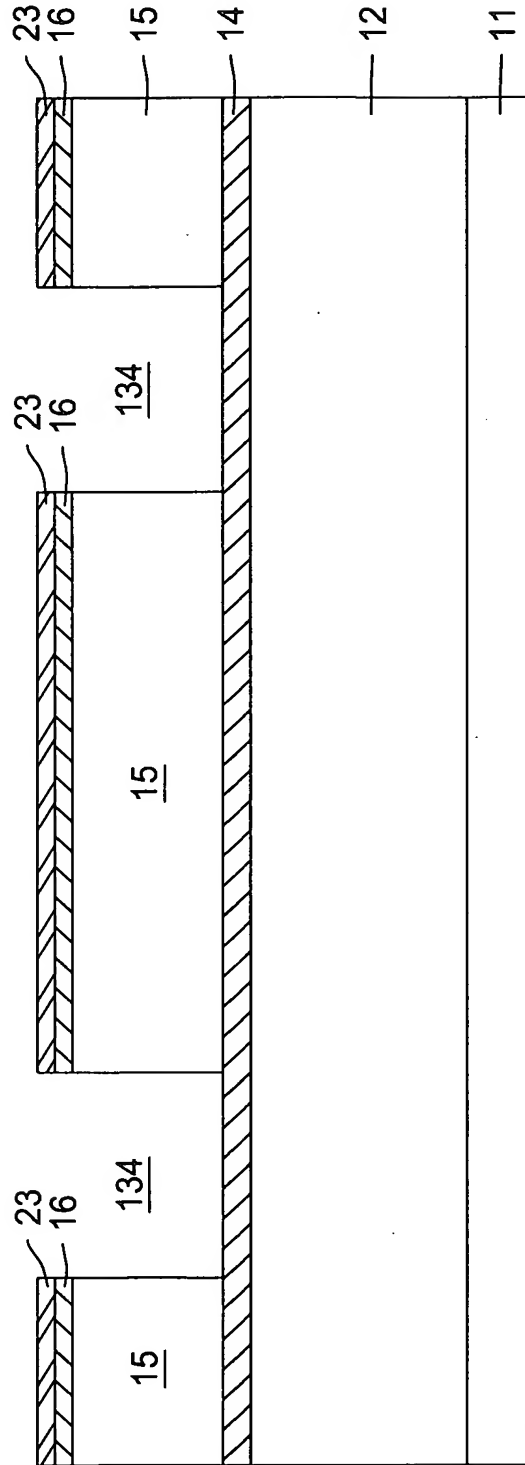


Figure 179



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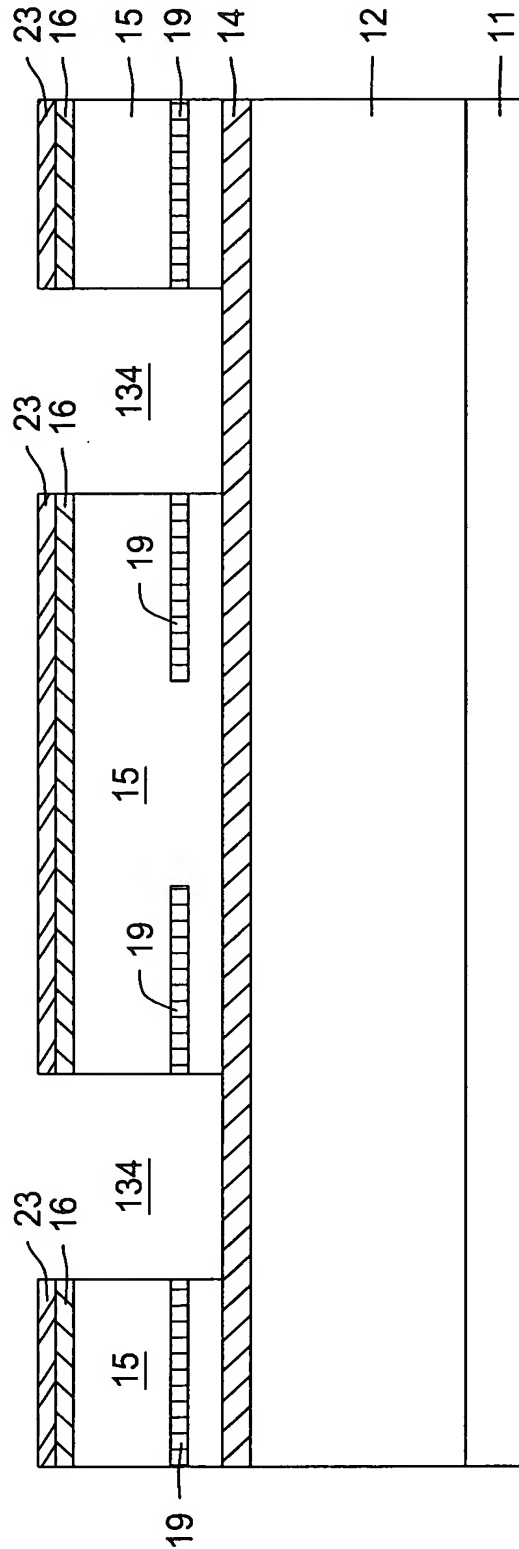


Figure 180

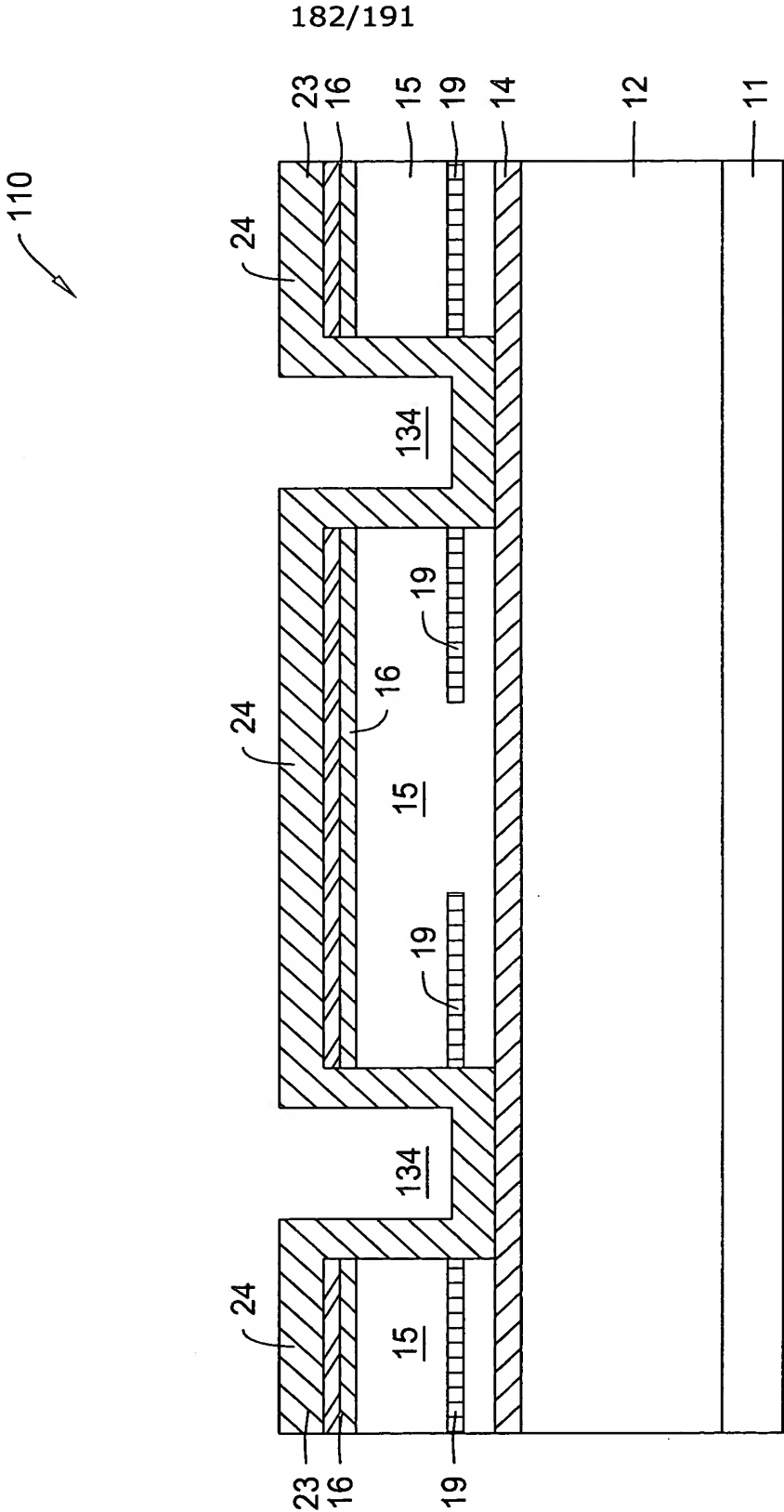


Figure 181

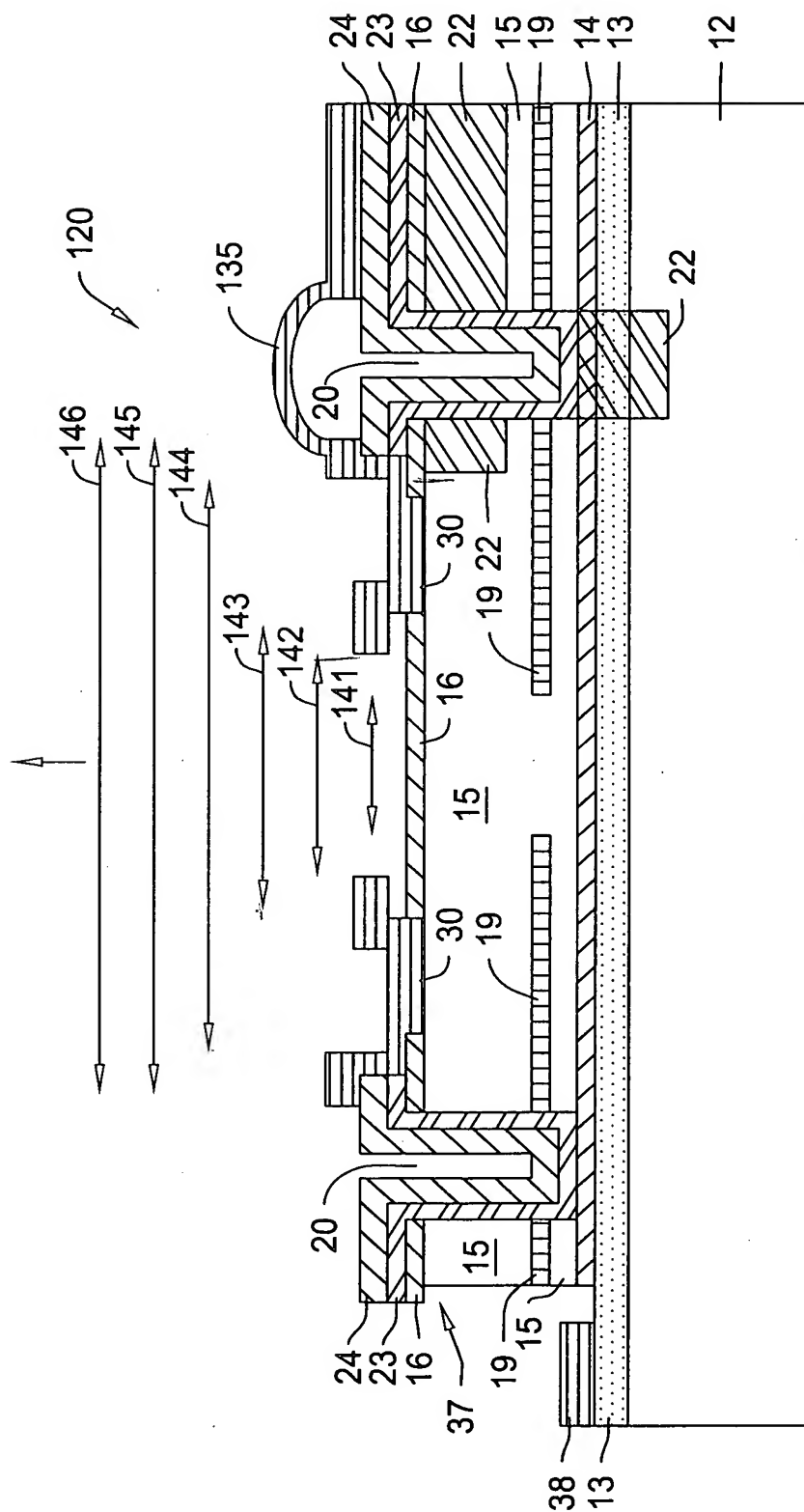


Figure 182

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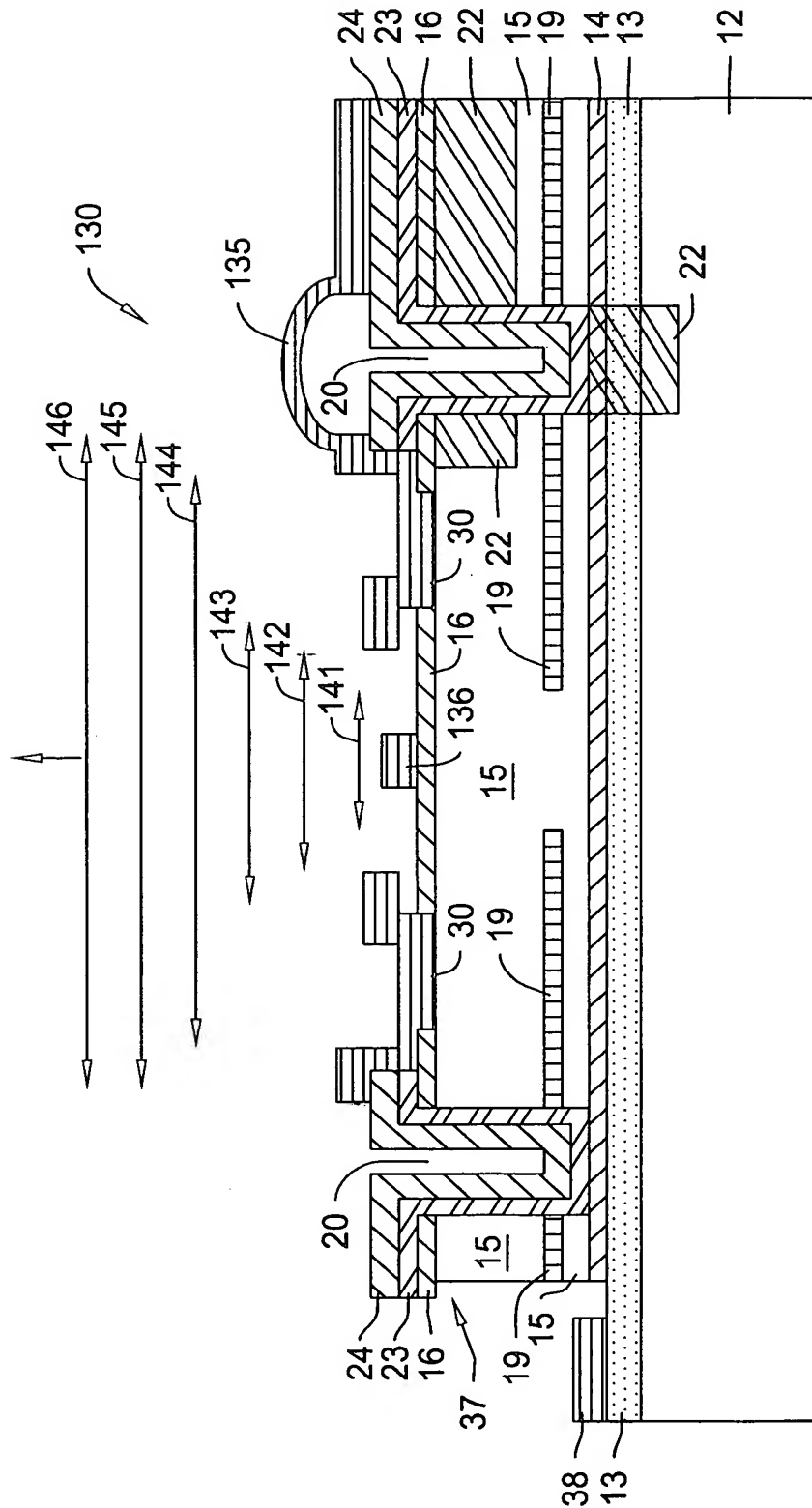


Figure 183

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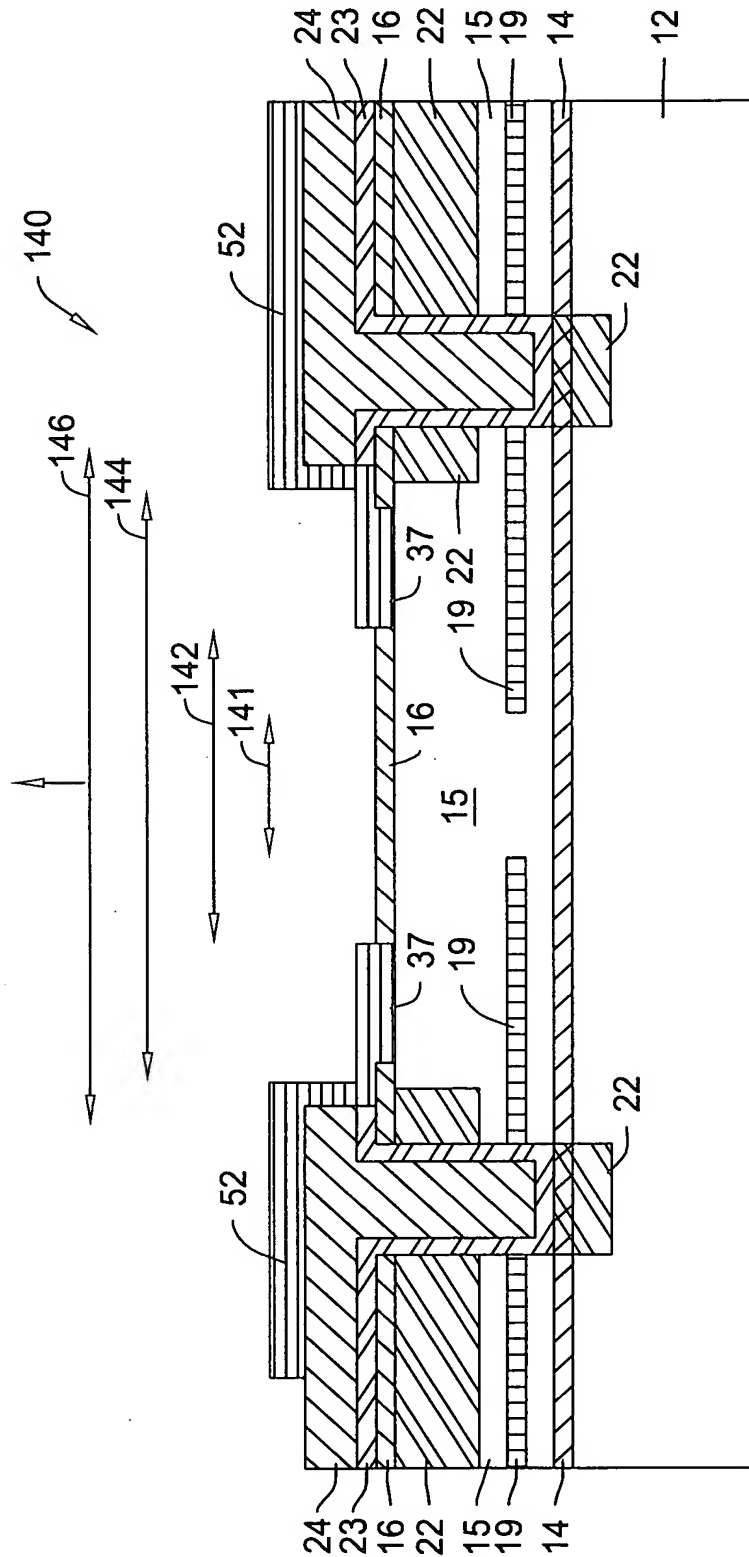


Figure 184

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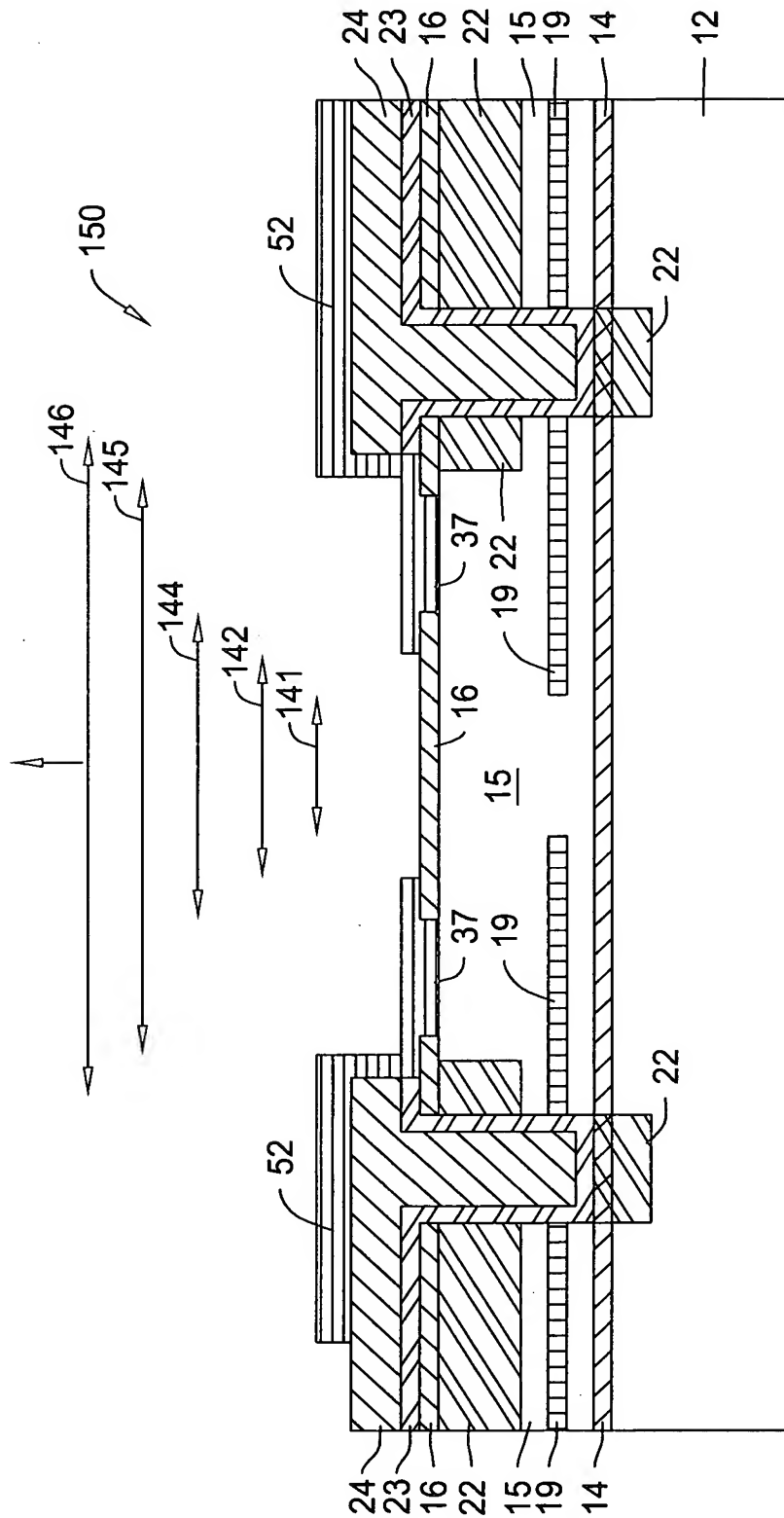


Figure 185

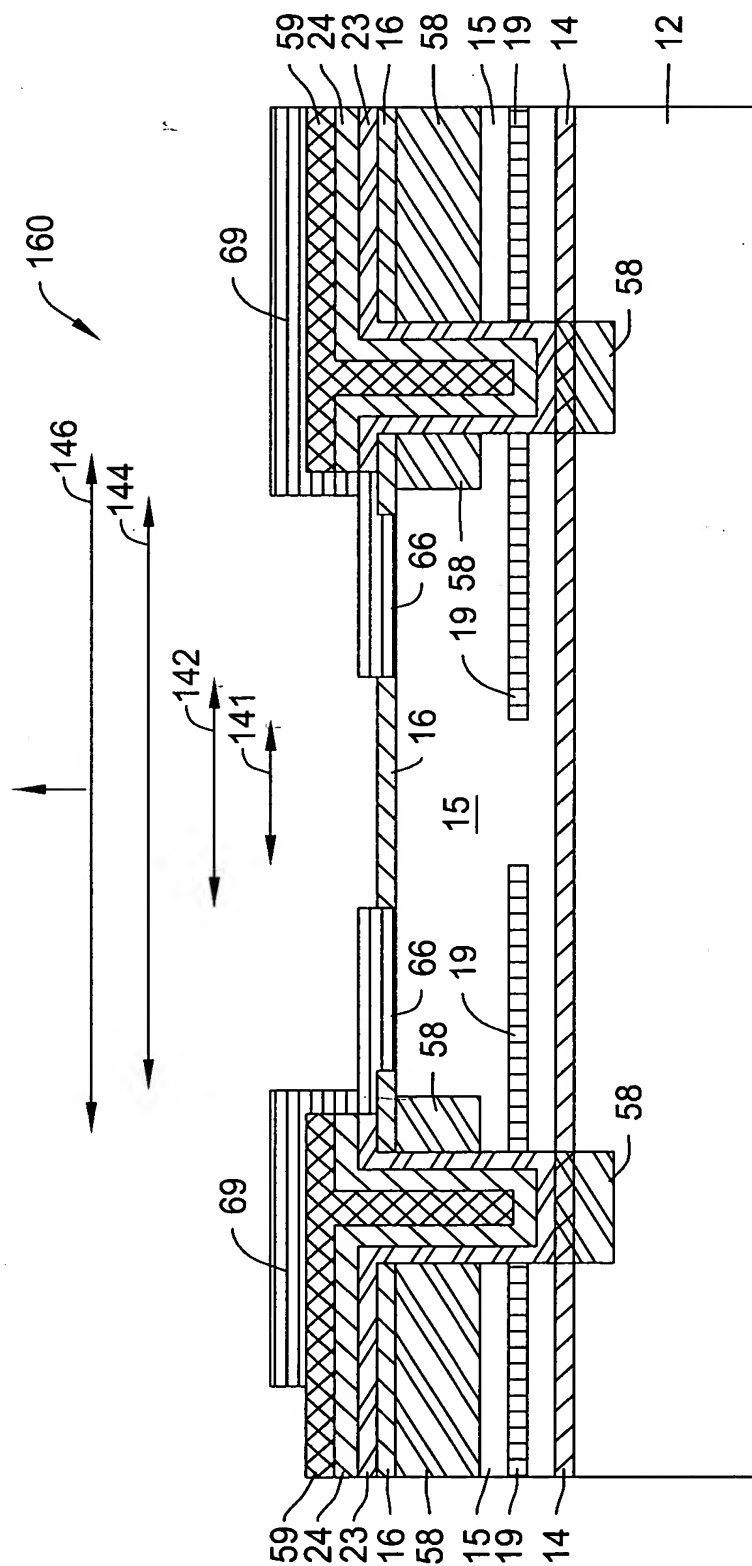


Figure 186

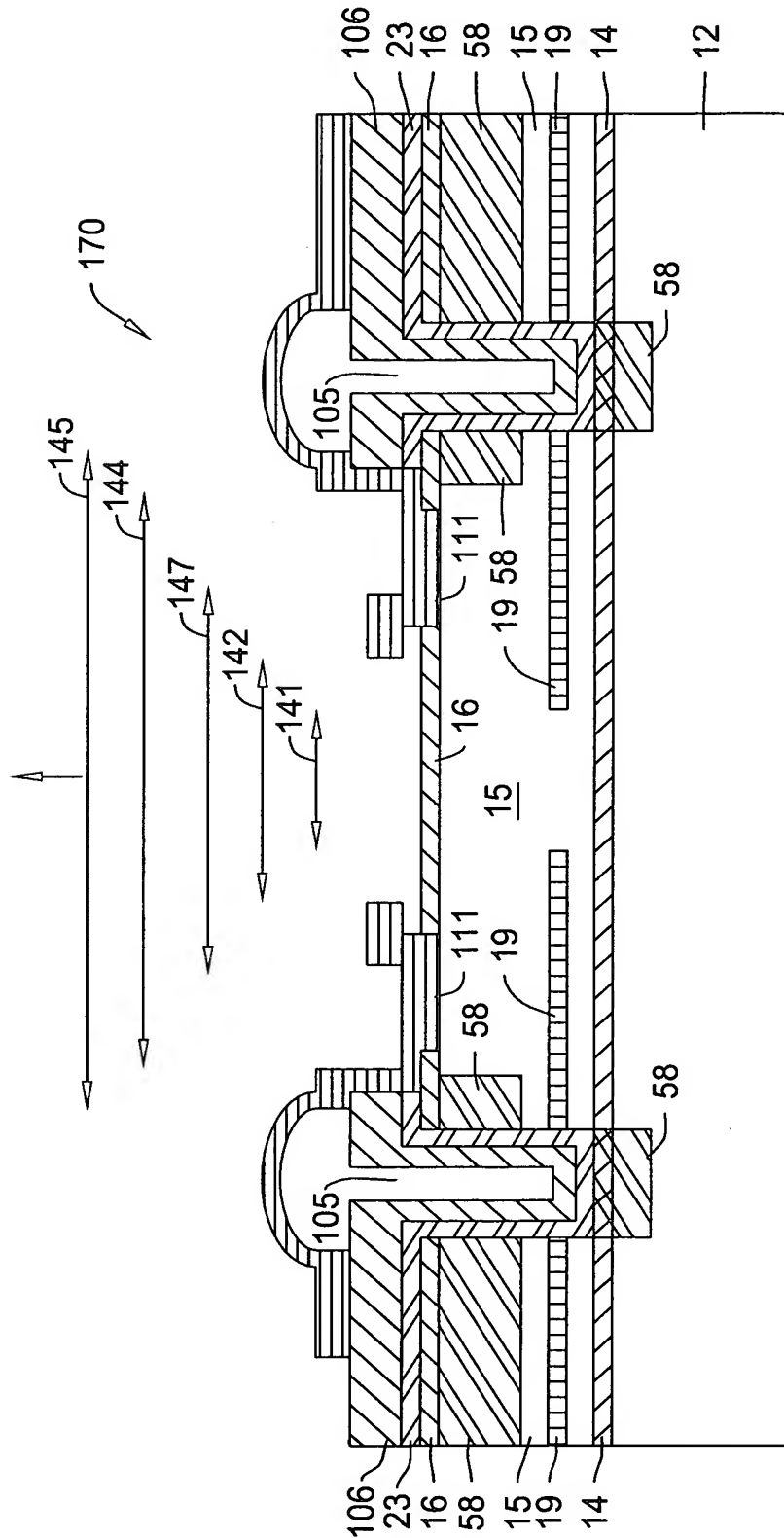


Figure 187



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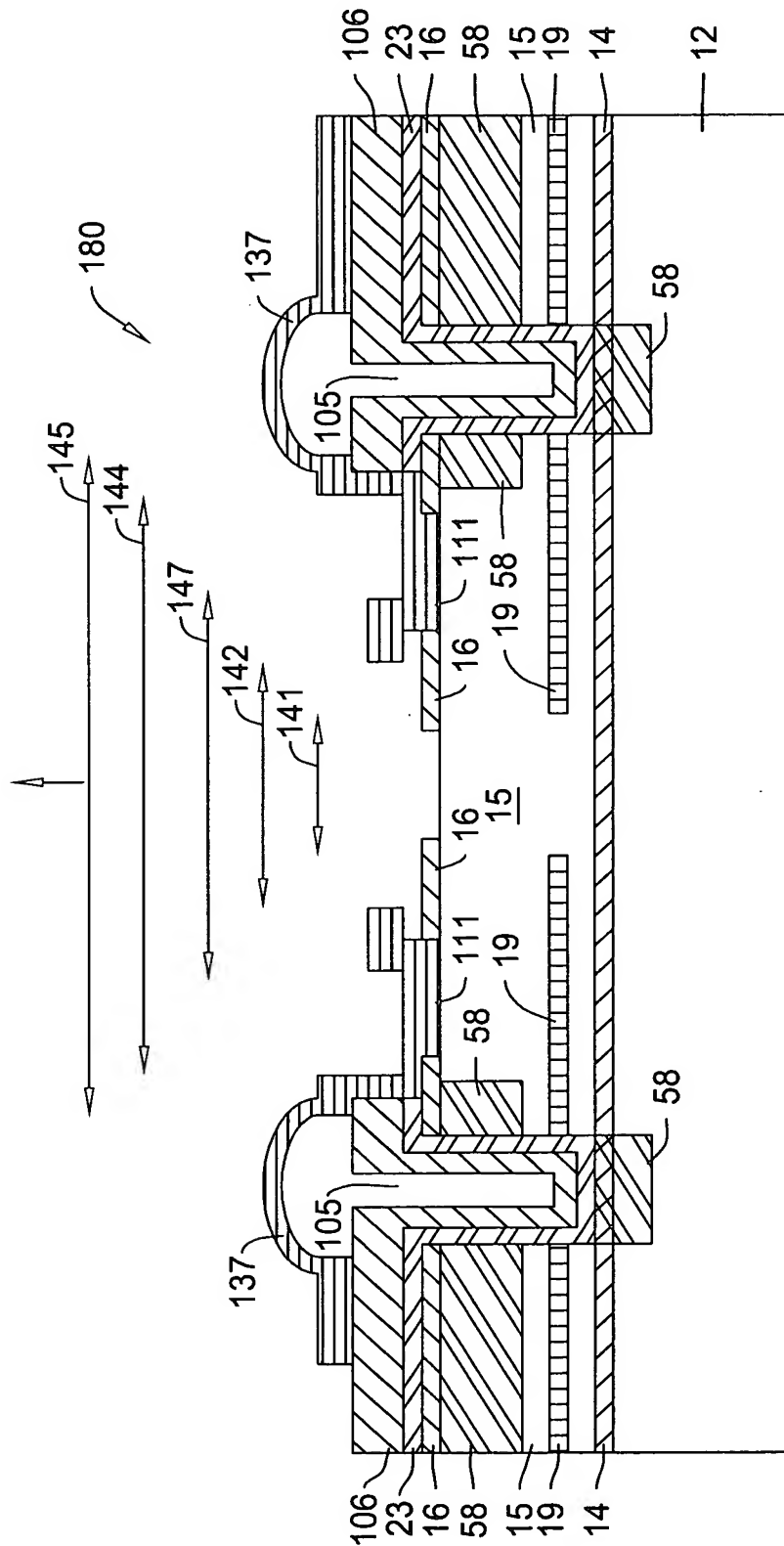


Figure 188

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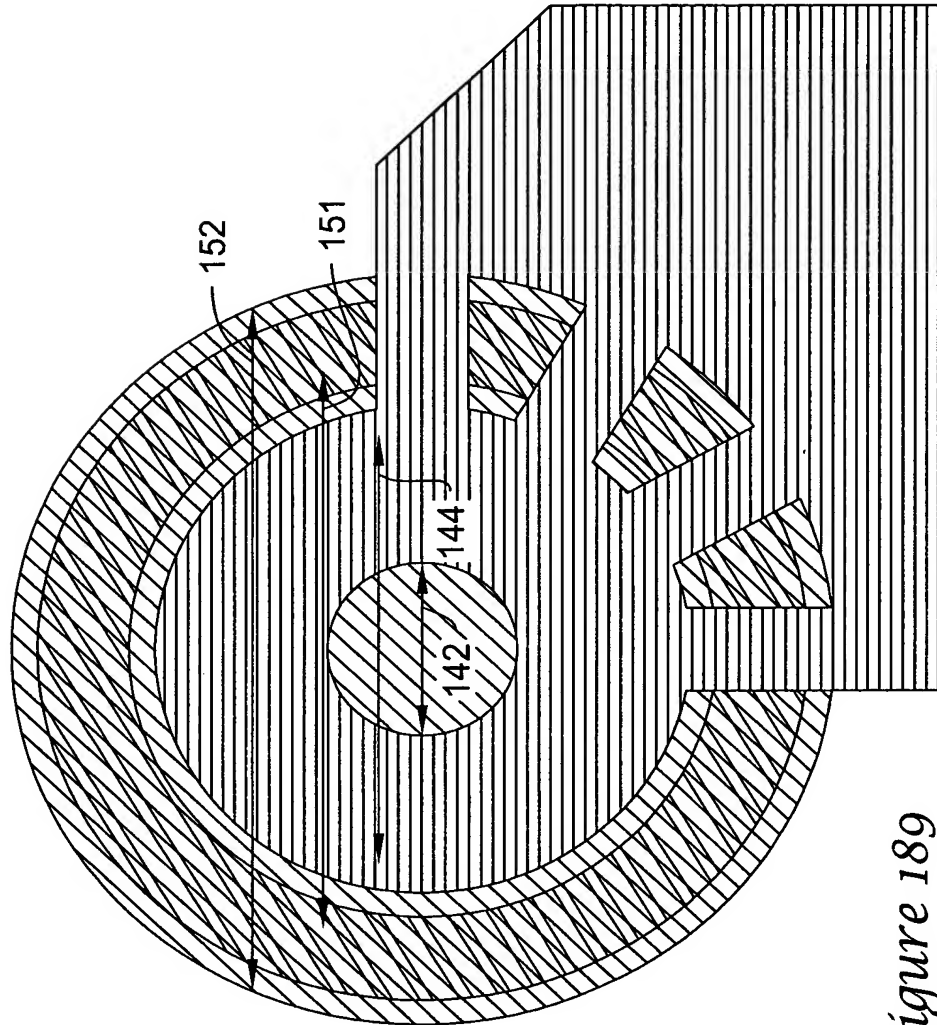


Figure 189

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## Standard Layout Geometry

<u>Feature</u>	<u>Variable</u>	<u>Dimension</u>	<u>Notes</u>
Oxide Aperture	A	Variable	VCSEL Aperture
Oxide Trench ID	B	A+20	10 um lateral oxidation
Thin Trench OD	-	B+5	2.5 um wide trenches
Wide Trench OD	D	B+8	4 um wide trenches
Isolation	-	B-4	Implant isolation
Aperture Via	-	B-4	Area without thick coating
Inner Metal ID	C	A+M	Metal aperture pullback variation
Inner Metal OD	-	B-2	Partially covers trench
Contact Via ID	-	C+3	optional? Extends below metal ID
Contact Via OD	-	B-6	Slightly less than aperture via
Air Bridge ID	-	B-2	For patternable trench fill-ins
Air Bridge OD	-	B+12	Matched to wide trenches
AB Aperture D	-	C+4	Larger than metal ID
Outer Metal ID	-	B+10	Partially covers wide trench
Outer Metal OD	-	B+18	4 um wide outer metal ring
SA Coplanar ID	-	D+8	Largest diameter: 42 um
SA Coplanar OD	-	180	Set to near edge of die
HOM(Metal) Filter	F	Variable	Circle/polygonal pattern in aperture area
HOM(Etch) Filter	F	Variable	Circle/polygonal pattern in aperture area
Oxide Aperture Variations (A): 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 um			
Metal Pullback (diameter) (M): 1, 3, 5 um			
Higher Order Mode Filter (diameter) (F): .5, 1, 2 um			

*Figure 190*